Water and Roman Urbanism

TOWNS, WATERSCAPES, LAND TRANSFORMATION AND EXPERIENCE IN ROMAN BRITAIN

ADAM ROGERS

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Towns, Waterscapes, Land Transformation and Experience in Roman Britain

By

Adam Rogers

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Cover illustration: The head and shoulders of a river god, or possibly Neptune, in oolitic limestone from an unprovenanced location in Cirencester (photograph used with permission of the Corinium Museum, Cirencester).

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For my mother

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CHAPTER ONE

INTRODUCTION

This book is about rethinking the relationship between urban settlements and water in the Roman period, focusing principally on the towns of Roman Britain, and what this theme can tell us about the way in which these urban spaces were experienced. It is not intended to be another work examining the infrastructure of the water supply in towns, for which there are many important publications available, or themes more common to Economic Geography such as trade links, but the relationship between urban space and waterscapes which has not received as much consideration from a social perspective. The book looks again at the apparently familiar topic of Roman urbanism and demonstrates that there is still much that can be done to advance our understanding and bring more nuanced interpretations of the material available to us. Theoretical frameworks help to ensure that our understanding of this material is sophisticated and avoids, where possible, modern cultural biases.

Through key themes and frameworks for analysis, and merging conventional divisions in archaeological scholarship such as urban/rural and land/maritime studies, it is the intention to bring a more holistic understanding to urban spaces. The presence of water is often taken for granted, or neglected, in discussions of towns but it formed an important aspect of the way in which urban spaces were used and experienced and can be informative of attitudes towards land, water and landscape change. The book is primarily an archaeological work and it intends to examine the social significance of water in the urban context: the way in which contexts of water formed physical elements of the inhabited urban spaces, the influence of water on human experiences in towns and the physical impact of town development and use on the land and water. Though not usually solid (unless frozen), water is a physical substance and it would have formed part of the material world of past inhabitants with cultural values associated with it. Water and the contexts in which it is found can, therefore, be studied archaeologically like other features—both those found naturally and those created by human action—that formed part of the socialised landscape. Water formed a significant part of the urban structure not only in aqueducts, water pipes, bathhouses and other constructions but also in the

form of rivers, groundwater, wetlands, lakes, springs and other contexts in the landscape. This book explores how we might be able to examine and interpret the relationship between towns and water in more nuanced ways and how this can influence our understanding of the urban experience. Our understanding of this relationship must be contextualised in the social specifics of the period especially the pre-existing uses and attitudes towards landscape.

Studies of issues connected with wetlands, land transformation and land reclamation in the Roman period have focused predominantly on rural contexts in the Roman period, especially coastal areas such as the Somerset Levels and the East Anglian Fenland (e.g. Cook and Williamson eds. 1999; Fulford and Allen 1986; Rippon 1996; 2000a; 2000b). The presence of wetlands in other contexts, including urban locations, has not received the same level of study. Similarly, maritime archaeology focuses on important social themes connected with human interaction with water but studies have tended to be undertaken by specialists that do not also consider social issues connected with the relationship between settlements and water. There is often a dichotomy in archaeological studies between the investigation of urban and rural contexts as well as land and water contexts. Through methodological and theoretical frameworks taken from wetland archaeology, maritime archaeology and geography we can examine the nature and impact of the relationship between land and water in urban settings.

Waterscape is a collective term which encompasses all features connected with water in the landscape including rivers, lakes, pools, wetlands, springs, groundwater and seas (cf. Strang 2004). Some or all of these features could form a significant element of the topography, structure and materiality of a town and its environs. Beyond its practical value, water had considerable social significance (cf. Kosso and Scott eds. 2009a; Shaw and Francis eds. 2008; Strang 2008), and the way in which it was encountered, experienced, used and transformed in the landscape not only as wetlands but also as rivers, lakes and other features, must form an important aspect of settlement studies. Importantly, waterscape also refers to the cultural value placed on the different contexts of water and the human actions that they encouraged; thus riverbanks and other waterfronts, and islands within water, are also important components of the waterscapes. Forming part of the inhabited and settled landscape, these watery features were not 'natural', as distinct from the built environment, but highly acculturated elements of it regardless of whether they were actually physically altered by human activity or not (cf. Insoll 2007). These features formed an important part of the history of settlements and the way in which they were expe-

rienced. The concept of the waterscape forms an important theoretical framework through which it is possible to bring new aspects of understanding to urbanism. Examining the full range of components of waterscapes indicates the complexity of the relationship between water and urbanism and its impact on the urban experience. This emphasis on the social significance of water and human engagement with the land can also be beneficial for studies of rural landscape archaeology, which has tended to focus on practical and economic issues connected with the use and treatment of wetlands. A central part of the book is the examination of the physical presence of water in the urban landscape and the human relationship with waterscapes looking at land use and land transformation as an aspect of urban development. Components of waterscapes were used and altered by human action as settlements developed and adapted to their settings.

Rivers and other forms of water were changed through water course alteration, land drainage and reclamation, waterfront construction (altering the land/water interface) and building activities. These activities could be major acts of landscape change with social implications that could form important elements of urban biographies. Water was manipulated in ways that formed significant aspects of the urban structure. The treatment of water also has implications for understanding local identities, and changes in the Roman period, through the various reactions to, and experiences of, the landscape. The meanings associated with these actions will have derived both from the local significance of each place and wider perspectives relating to the alteration of landscape. There have now been a number of useful works concerned with geoarchaeology (e.g. A. Brown 1997; French 2003; Marriner 2009) but the specialist geographical, hydrological and geological knowledge needed for much of this work has created divisions from social perspectives. It is necessary to draw on some of the specialist knowledge of this work but the intention is to focus on the social significance of water's physical presence within towns.

Whilst considering water archaeologically is a methodological issue that can be applied to our understanding of settlements of all periods, there are also issues specific to each period relating to the cultural values associated with the waterscapes. In Roman Britain these cultural values, especially, drew on pre-existing meanings associated with places in the landscape but also the attitudes and experiences of these coming into Britain after the conquest. It is also possible to address important wider debates in Roman archaeology through this material including topics such as Romanisation, imperialism and discrepant experience.

The main case studies used here come from Britain where the Roman urban settlements have been a focus of interest for centuries from the surviving structures and accidental unearthing of remains in earlier centuries to large-scale Victorian and Edwardian excavation programmes and the work connected with post-war and later urban redevelopment. As well as urban excavation and publication, towns have been the subject of large numbers of works of synthesis which have advanced our understanding not only of these settlements but of Roman Britain as a whole (e.g. Creighton 2006; Frere 1967; Millett 1990; Wacher 1975). The importance of these urban settlements as an archaeological resource makes them highly suitable for research from a variety of perspectives and new directions; and the extent of existing knowledge allows for considerations of townscapes rather than individual buildings. Our current understanding of the Roman towns, however, does not mean that our knowledge cannot be challenged and that we can ever know fully how towns functioned and how they were valued and experienced as settlements. Each town must also be investigated in terms of its individual context and process of development.

There was a range of settlements conventionally termed towns in Roman Britain and organised in relation to their legal status. This status would also have had an impact on the nature of the urban development and the population of the settlements. There were the *coloniae* (colonies) which were established on the site of earlier fortresses: Colchester (*Camulodunum*), Gloucester (*Glevum Colonia*) and Lincoln (*Lindum Colonia*). York (*Eboracum*) was also a *colonia* but later in date and it developed on the other side of the river to the fortress. At an earlier time, York may have been a *municipium* (Ottaway 2004: 83). The only other example of the use of the term *municipium* in Britain is for Verulamium (near modern St Albans) and it is possible that this was a later upgrade from *civitas*-capital (Niblett 2001: 66). Other *civitas*-capitals included Silchester (*Calleva Atrebatum*), Wroxeter (*Viroconium*), Winchester (*Venta Belgarum*) and Canterbury (*Durovernum Cantiacorum*). London (*Londinium*) appears to have been distinct from these categorisations coming into existence at an early date and expanding quickly into the largest urban settlement in Britain and possibly becoming the provincial capital. Whether it was principally a strategic or economic foundation has been the subject of much debate (cf. Milne 1995; Perring 1991) and this remains ongoing with some recent discoveries in the Cornhill area of the town, with possible military appearance, leading to the suggestion that there may have been a Claudian period fort or temporary base here (Perring 2011). This evidence remains problematic and there is little dating evidence but Perring has suggested that the stratigraphy of the sites and the absence of later material

of the AD 50s, common to sites here, could indicate that the activity was early. As a result Perring (ibid.) has emphasised a greater role played by the military in the foundation of London with the fort even relating to the actions of the invasion force of AD 43; London may have formed part of the process of the military and imperial control of Britain and its commercial role followed on from this. If this was the case, it seems likely that the economic advantages of its location would also have encouraged development through official means. There have since been counter arguments relating to the reliability of this material, however, notably by Wallace in her study of the origins of Roman London (2011) which adds to the continued uncertainities about London's early phases of activity and the likely range of circumstances and inputs that were involved at this time. As will be discussed in this book these arguments relating to our understanding of the material tend to focus on military or economic interpretations which limits what we can do with this material to understand social attitudes and conditions in the past. There also remains no conclusive evidence that the provincial governor used London as a permanent official residence (cf. Millett 1998), and the concept of a provincial capital may be problematic, although the later permanent fort attached to the town at Cripplegate might be in support of this.

The standard narrative for Britain after the invasion of AD 43 includes the strategic foundation and spread of military bases from the southeast to the north and west into the AD 50s and 60s (e.g. Frere 1967; Wacher 1995). Some of the fortresses, such as at Colchester, Gloucester and Lincoln, became urban settlements as they were redeveloped into *coloniae* (Webster ed. 1988), and forts are also known to some *civitas*-capitals as at Wroxeter (White and Barker 2002), Exeter (*Isca Dumnoniorum*) and possibly Cirencester (Holbrook 1998). Other *civitas*-capitals appear to have developed on sites with apparently no Roman military establishment as at Canterbury, Silchester and probably Winchester but with pre-Roman activity. The towns defined as *civitas*-capitals are usually regarded as the centres of administrative divisions in the province—the *civitates*—but the extent to which this is based on the pre-existing political make-up of Britain has been the subject of much debate (e.g. Creighton 2006; Mattingly 2006; Millett 1990; T. Moore 2011). What is important, however, is that each town will have developed in a landscape of pre-existing use and meaning which will also have formed part of the biography of urban development. This is explored further in Chapter 2 and throughout the book. There are also settlements conventionally termed 'small towns' which did not have the same legal status as towns but nonetheless it appears that they often fulfilled important functions in the *civitates* and could be prosperous in their own right (Burnham and Wacher 1990).

Experiencing Water

A useful preliminary issue to consider for this introduction, before moving onto the main analyses of the material in the next chapters, is the way in which water as a substance is experienced through the senses and the contextualised cultural values attached to water. The obvious importance of water to human existence has meant that many cultural values have been associated with it through time including those associated with religious belief, hygiene, fertility and productivity and danger (cf. Kamash 2008; Oestigaard 2011). A huge subject in itself, it is an important reminder of the potential cultural significance of the interaction between urban spaces and water. The phenomenology of water, however, has not generally been given as much attention as the phenomenology of land as a way of understanding the way in which settlements, and their landscape settings, were experienced. Haughey (2007: 120), for example, has made the important observation that studies of prehistoric monuments have rarely put much emphasis on the rivers and other contexts of water in the vicinity of the structures. Acknowledging the possibilities of engagement with all features in the landscape should be especially important in studies examining the phenomenology of these monuments (cf. Tilley 1994). Movement and experience associated with contact with water would have been as equally important, where it is found, as contact with the land. Modern perspectives in studying archaeological sites and monuments tend to relegate water to having a less significant role than buildings and other land-based features. All engagements with water, however, will have entailed the enactment of particular ideas concerning human relationships with the environment (Strang 2008). This relationship is particularly relevant when we consider towns and their interaction with watery environments.

Water has of course always formed an important part of Roman urban studies but this has predominantly focused on the theme of water supply, distribution and storage and there have been a number of important studies on aqueducts, water pipes and sewers (see below). There has been less consideration, however, of the way in which water could form an integral part of the lived experience rather than it simply forming an amenity. Each spring, river, stream, lake and other watery context, moreover, will have had individual characteristics influencing the specific nature of the local landscape and urban setting (cf. Edlund-Berry 2006: 162). Water has chemical properties which are well known scientifically, but as a substance it can still be ambiguous to us; it is a substance that must be culturally interpreted so that it can be accepted as part of the landscape. As a result, water can

carry many meanings and is rich in symbolism (Kosso and Scott 2009b: 2). The way in which water was encountered and experienced will have had an impact on the relationship between settlement and water and will have had cultural differences. This includes experiences relating to the senses—touching, seeing, hearing, smelling and tasting water—as well as cultural attitudes towards different kinds of water in relation to its colour, sight and taste and the perceived effects of water on the human body.

In the Roman world water will have been experienced differently by the diverse range of people and traditions found across the Empire. There are textual sources which contain information relating to the way in which water was experienced. These are useful but it is important to recognise that these will refer predominantly to the elite of Rome and need not be of much relevance for our understanding of the views of the people in Roman Britain, for example; although we do know that the people of the towns of Roman Britain will have included a number of incomers from elsewhere in the Empire including Roman officials (Eckardt 2010). Although this book is not about Rome, it is nonetheless worth examining a selection of the sources here, dating mainly to between the first century BC to second century AD, as an example of the way in which water was experienced from these perspectives; they also indicate a range of ideas related to water here around the time that Britain was incorporated into the Empire.

The textual sources demonstrate, for instance, that there was much debate regarding the relationship between water and health and the different sources of water that were preferable for drinking. Medicine was tightly bound to ideas about water and the balance it provided to the body (cf. Kosso and Scott 2009b: 2). Pliny the Elder (AD 23–79), for example, describes a debate centred on the appropriateness of different sorts of water for the human body (*HN* XXXI). He stated that most doctors preferred running water and advised against drinking stagnant waters, although some doctors continued to recommend cistern water (cf. De Kleijn 2001: 87–88). Pliny argued that the best drinking water was transparent, clean, odourless and colourless (*HN* XXXI.37, 39), demonstrating the importance of the senses in judging water. For other writers, however, other types of water were preferable: for Columella, writing in the first century AD, rain-water led into a cistern was the best source of water and would have a healthy and nourishing effect on the human body (*Rust.* I.5.1–3). Seneca, also writing in the first century AD, also wrote about the taste of water: “some (waters) are sweet, others have flavours that are disagreeable in different ways, amongst them are the salty, the bitter and the medicinal. In the last category I mean sulphur, iron and alum waters. The taste indicates the properties” (*Q Nat.* III.2.1). In some

texts, some specific sources of water were identified as being especially good to drink such as the cold springs near Ardea (Vitr. *De arch.* VIII.3.2), but there could be considerable disagreement on the nature of the water from different sources as Edlund-Berry (2006: 167) has highlighted. Vitruvius (*De arch.* VIII.3.2), for example, in his first century BC work, wrote that the water of the River Albula near Tivoli was particularly high quality and cold whilst Pliny the Elder (*HN* XXXI.6.10) considered the same water as being only lukewarm.

Hodge (2000a: 97), however, has made the point that probably not much water was drunk in its pure state and instead it would have been mixed with something else, such as wine or boiled and used to make other drinks. It is also important to avoid applying modern biases onto the past when judging past water sources, water quality and cultural responses to different contexts of water (cf. R. Thomas 2000: 10). It is possible that sources of water such as swamps, muddy rivers and streams need not have been considered unsuitable for providing drinking water and may even have been preferred local choices. It seems likely that individual sources of water will have been regarded as having different tastes and qualities and were valued in different ways.

As well as taste, the sight and appearance of water is another important aspect to consider in connection with water's relationship to settlement. Water, for instance, refracts light which can make it difficult to judge its depth by sight and this can add an element of danger to it (Kamash 2008: 229). This 'secretive' nature of water is also emphasised by the fact that it can harbour diseases and impurities that are not visible to the naked eye. Its reflective quality also means that it can take on different colours and images of its surroundings which can give illusions of magical qualities (ibid.: 231). Strang (2004: 51) describes how the human eye is automatically drawn to a flickering or moving stimulus. The shimmering qualities of water and patterns produced on its surface can stimulate cultural responses that are quite different from those resulting from observing other kinds of objects. With inanimate objects the eye can trace form and colour in detail, but with moving water, the eye attempts to cope with an object that it cannot hold (ibid.). It is endlessly changing in colour, lightness and form (Strang 2005: 98) which can encourage a vast diversity of experiences and cultural meanings being attached to water.

Getting sight of and encountering water will have been a significant element of the experiences gained by moving through the landscape. The comprehensive knowledge of entire river systems that we have today is the product of scientific research and the invention of aerial flight and

satellite imagery (cf. Johnson 2007 on viewing landscape; Haughey 2007: 119). Seeing water only at specific times and locations as part of the movement through the landscape will have encouraged different interpretations and experiences of the various stretches of the same river. The sound made by the water will also have differed according to how and where it was moving. Any movement of water produces a sound and water will have formed a significant element of the urban soundscape including the flowing of water through rivers, gullies pipes and drains, the torrents of rain, and the dripping of water into puddles. Walking through water, moreover, cannot be done quietly and the act will have focused the walker on that particular place and moment in time. Linked to the act of moving through water is the way in which it is experienced through touch which can be hugely variable due to the changeable nature of water, especially relating to its temperature and speed of movement or whether it is still or frozen (Strang 2004: 50–51; 2005). Snow and ice will have formed a significant element of townscapes and it can also alter their appearance and the way in which the streets could be traversed. Current knowledge of the climate in Britain at the time of the Roman conquest suggests that it was probably similar to that of today with temperatures possibly rising further in the third and fourth centuries before falling again (Dark 2000: 19). This would suggest that the climate was not necessarily wetter in the early Roman period but the landscape itself would have had many more wetland contexts which had since been lost due to the long history of landscape use. Disease linked with dirty and polluted water, as well as infestations, will also have formed an aspect of cultural attitudes attached to waterscapes and their relationship with settlement. The way in which these experiences were interpreted will also have differed according to local cultural perspectives as well as individual opinions.[1]

The volume and complexity of laws relating to water use and provision in Rome and Italy, known from surviving documents, can also provide another source of information on the way in which water was experienced. They also reflect the way in which it was considered desirable that water was controlled and organised especially by the elite. Water laws and rights have

[1] Hartley's (1964) exploration of water in medieval and post-medieval Britain, *Water in England*, details the rich and varied ways in which water formed an integral part of everyday life including its use in domestic and industrial activities. It also relates many of the customs and values attached to different sources of water and its use and treatment, long since forgotten, but which paint a vivid picture of the way in which water formed such a central part of cultural life in a way that has been neglected today.

been the subject of a number of important studies including Bruun (1991; 2000), De Kleijn (2001), Bannon (2009) and R. Taylor (2000). There are some references to water laws as early as the mid-fifth century BC with the Law of the Twelve Tables and then in the Augustan period there are some laws relating to water provisioning (*cura aquarum*) in Rome; but the majority of laws belong to the Imperial Period, and they have a complex history of survival. Most appear in the *Digesta* which forms one part of the *Corpus Jurus Civilis* compiled in the first half of the sixth century by the Emperor Justinian I. The *Digesta* consists of legal writings principally dating to the second and third centuries AD and written by jurists including Ulpian and Paulus (Bruun 1991). As Bruun (2000; 2010) has made clear, however, such strict laws relating to water distribution and the role of the emperor will have applied mainly to Rome; there is no indication that the *curator aquarum* of Rome would have had any power outside the city and the immediate catchment area of its aqueducts. It seems most likely that towns handled the management and distribution of their hydraulic resources independently of Rome. Even so, what is especially important about these complex laws in Rome, and probably elsewhere, is the way in which they represent attempts to organise water and control it through this organisation.

One important aspect of the writings of the jurists is that they make a distinction between public and private water, although the reasons behind the decisions and thought processes are not always easy to understand today (cf. Bruun 2000). According to the *Digesta*, the sea was public as were some lakes and most rivers although some rivers, especially small and seasonal streams, along with springs could be private and so not used without permission by the owner or the authority that had power over it (*Dig.* XLIII 12.1.3; XLIII 14.1.3; 14.1.6). There was also within Roman law the concept of servitude which gave property owners the right to channel water from or over his neighbour's property (Bannon 2001; 2009). It is clear also that there were disputes regarding individual springs and streams across Italy (e.g. *Dig.* XLIII 12.1.3). Difficulties were sometimes encountered in the classification of water: "some rivers are public, whilst others are not. Cassius defines a public river as a perennial river. This definition, approved by Celsus, appears correct" (ibid.). Campbell's (2010) study has shown that Roman lawyers also grappled with the complexities of changing rivers as they altered the land through changing courses or by flooding. There was also the issue of who owned the land as the river bed dried up when the river changed course. What is important here is that these laws demonstrate how attempts were made to organise water, and where it is found in the ground, in the human mind and to understand its different sources and the landscape in which they were found.

It seems possible that there may well also have been differences between public and private water in Roman Britain connected with the source of the water and the ownership of the land in which the source was located. There are, unfortunately, no textual sources available but it seems likely that the situation will have been further complicated by the nature of land and water ownership in the Iron Age which influenced practice and behaviour in the Roman period.

The issue of aqueducts passing through private land was also an important issue in Roman times (Bruun 2000: 582; R. Taylor 2000: 53). In Taylor's (2000: 53) words the "aqueducts of Rome traversed a legal landscape that was at least as daunting as the physical one"; the attempts to organise and understand the landscape were hugely complex. Aqueducts were obvious artificial elements of the waterscape and they are an aspect of how water was controlled. They were formalised channels of water fed from lakes and springs and ultimately from rain. Drains and other conduits carried wastewater away as an integral part of this water cycle; towns formed part of this living process. Aqueducts and drains, however, are not simply about supply as they can be considered in terms of attitudes towards water, water control and the waterscape. With the rivers and other sources of water, they also formed important elements of town life and the urban experience.

The aqueducts of Rome themselves, and those in other parts of the Empire, have formed a major component of investigation for both archaeologists and ancient historians (e.g. Aicher 1995; Ashby 1935; Bedon 1999; Bianco 2007; Burgers 2001; Catalano 2003; De Kleijn 2001; H. Evans 1994; Hodge 1992; ed. 1991; Koloski-Ostrow ed. 2001b; Van Deman 1934; R. Taylor 2000). Taylor (2000: 13–15) has usefully outlined the key individuals in aqueduct studies from the sixteenth century onwards. Despite this long and varied history of interest, studies have predominantly taken the perspective of modern water provision for granted in their interpretations of Roman water supply whilst often undertaking highly specialist and technical studies of the aqueduct structures and their courses. Work on aqueducts has tended to omit concerns relating to their social implications (cf. Koloski-Ostrow 2001a: 2). It is likely that some famous passages in the classical sources have also influenced scholastic attitudes towards aqueducts including Pliny the Elder (*HN* XXXVI.24.123): "there is nothing more worthy of admiration throughout the whole universe"; and, of course, Frontinus with his comparison between aqueducts and the pyramids (*Aq.* 78). Aqueducts have played a part in many studies wishing to emphasise the civilising forces of Rome and the benefits they brought to a province: "any city worthy of the name felt that it had to have an aqueduct" (Hodge 2000d: 47).

Monumental arches in aqueduct structures, however, were not generally common and it was more usual for the conduits to run at ground level or just below. Aqueducts also played only one part in the overall system of water supply and much less attention has been given to the methods of water distribution once the aqueducts reached the settlements—studies which could reveal much more about the social effects of water supply on urban populations (cf. De Kleijn 2001; Koloski-Ostrow 2001a: 3). Frontinus' treatise on the aqueducts of Rome outlines the history of the early aqueducts (*Aq.* 5–15) and consequently considerably more is known about these structures than others in the Empire: the Aqua Appia constructed in 312 BC, Anio Vetus in 272–270 BC, Aqua Marcia in 144–140 BC, Aqua Tepula in 126 BC, Aqua Iulia in 33 BC, Aqua Virgo in 19 BC, Aqua Alsietina in 2 BC and the Aqua Claudius and Anio Novus in AD 38; the Aqua Traiana, dedicated in AD 109, was too late to be included in the treatise (R. Taylor 2000: 19) and a final aqueduct, the Aqua Alexandrina, was dedicated in AD 226 (Aicher 1995: 104). Whilst the number of aqueducts built in Rome in the Imperial period was small, they were also constructed across the empire which can perhaps be seen as much as the desire to make an Imperial impact on the landscape as any practical necessity (cf. Angelakis et al. 2005; Coulton 1987; Fraser 2006; Lolos 1997; Longfellow 2009; 2011).

Further insight into the ordering and understanding of water can be gained through the works of Frontinus and Vitruvius. In the case of both *De aquae ductu urbis Romae* by Frontinus and *De architectura* by Vitruvius there is still little consensus over the true motives behind the texts. At face value Frontinus' text, written in the late first century AD, is a practical guide to water distribution and the aqueduct system in Rome but its reliability has been called into question many times (e.g. Blackman and Hodge eds. 2001; Bruun 1991; De Kleijn 2001; Hodge 2000d; 2000e). The statistics in the text, for example, are only partial and it does not include the full extent of the aqueduct system (Koloski-Ostrow 2001a: 3). Hodge (2000d: 39) also argues that the usefulness of the text is limited because Frontinus was an administrator rather than an engineer and so provides little information regarding the day-to-day running of the aqueducts and instead goes into huge detail concerning the size of pipes and volume of water carried through them. He goes on to argue that the text has a political bias concerning Frontinus' appointment as *curator aquarum* by the emperor Nerva (*Aq.* 1) and his desire to demonstrate that he has made the office much more efficient and competent.

Rodgers (2004: 11) has argued that to attempt to categorise the work merely reveals the views and opinions of those studying the text and the information

that they hope to get out of it. Whatever the exact nature of its contents, the desire to put the information into a careful literary form is also significant. Rodgers (ibid.: 23) demonstrated that the language used by Frontinus overlaps that of both specialist writers and poets. The arrangement and detailing of the information represents the intricacies of the system and his command over it; the language persuades and convinces. For König (2007) the text is about the ordering of knowledge and it interweaves authority onto the subject. Like the water laws, Frontinus' text indicates an attempt to place order over water and nature more generally.

De architectura by Vitruvius is another problematic text and its descriptions are often highly theoretical in nature rather than having practical value (H. Evans 1994: 7). Hodge has argued that it may be that Vitruvius derived much of his material from other sources that he did not really fully understand (cf. 2000d: 39). Vitruvius was working in the late first century BC around the time of Augustus' rise to power and in the preface he dedicates the work to Augustus for what he has built and is planning to build in Rome (Vitr. *De arch.* I, pref. 3; McEwen 2003: 86–87). His descriptions of urban planning, public buildings and machinery, and Book VIII which deals with water and its manipulation, may well have been an attempt to emphasise the order and greatness that Augustus had brought to Rome and its Empire. According to Vitruvius, Rome had the power to control all things and use it for the good of the Empire. Since the work is the only substantial writing on architecture to survive, it has been hugely influential in later times, especially by architects in the Renaissance who were looking for parallels to represent their desire for order and scientific analysis.

Zanker's (1988; 1998) work has argued forcefully how Roman authority wished to extend itself to the realm of nature and Augustus especially used the idea of the control of nature as part of his consolidation of power and the creation of order. Architecture and images indicate the desire to manage and enclose nature. Depictions of foliage on monuments represented not only abundance, fertility and growth but also power and control—the reality of world order (Zanker 1988: 172–179). Aqueducts and other water supplies across the Empire were also a part of this control as were domestic structures and their gardens which saw the manipulation of water and the enclosure of nature in elaborate ways as Zanker's (1998) study of Pompeii has demonstrated (see also Ö. Wikander 2000a). Roman control of water is also reflected in the way in which land was transformed through drainage and reclamation, artificial water channels and altering rivers.

The known religious significance of rivers and other watery contexts in Roman times, as with other periods, is another important element of the

cultural importance attached to them and the places through which they flowed. Like the character of water itself, however, water deities and their origins, development and depictions can be difficult to pin-down and explain (cf. R. Taylor 2009).[2] The religious calendar in Rome was marked by days for cults associated with localised gods including nymphs at springs (Fowler 1899: 293; Scullard 1981: 64). Research on these religious events in Rome is a reminder of the way in which religious activity and belief formed an integral part of city life but the extent to which many people would have actively participated in these cults is uncertain.[3] The Tiber itself, the god Tiberinus, was venerated through such actions as offering prayers at times of need (Aldrete 2007; Fowler 1899: 214; Holland 1961; Meyers 2009; Scullard 1981: 202), and the God Janus was worshipped at crossing points of the Forum Brook (P. Jones 2005: 20). Across Italy and beyond in the Roman Empire it is well known that the sacredness of rivers and lakes was recognised not only by travellers from Rome but also be the local peoples. Pliny the Younger (AD 61–c. AD 112), for example, refers to his visit to the oracular cult of the River Clitumnus (Plin. *Ep.* VIII.8), and there are inscriptions surviving which relate to cults of the Rhine (CIL XIII.5255, 7790–7791, 8810–8811) and Danube (CIL III.3416, 5863, 10263, 10395).

With only very few textual sources relating to Roman Britain it is necessary to use patterns and phenomena observed in the archaeological evidence to assess attitudes towards water, and how water was experienced, and to contextualise the evidence within its prehistoric cultural background. The evidence of religious activity connected with water (Bradley 1990; Clark 1944; Wait 1985; Webster 1995) can perhaps be seen in terms of attempts to understand the various characteristics of water and respect the power that water has to provide the basis for daily life as well as bring destruction and death. Its necessity in life and its role in food production means that it can carry powerful intimations of life, fertility and increase (R. Taylor 2009: 21); but another important aspect of water is that it can also cause death and destruction. This paradox between life and death (cf. Kamash 2008), the binary oppositions of life/death, nurtures/kills, strengthens/enfeebles (R. Taylor 2009: 21), is perhaps one of the major factors that resulted in water

[2] Ancient images of river gods often took the form of human bodies with bull-like features which may relate to a representation of strength and masculinity, the force of water, as well as the association between water, bulls and sacrifice (Taylor 2009).

[3] The water nymph Juturna, for example, presided over a spring in the southwest corner of the forum at the Capitol and, according to Ovid (43 BC–AD 17/8) (*Fast.* I.463), the day of her cult was the 11th January (Fowler 1899: 293; Scullard 1981: 64).

becoming a highly symbolic and ritualised substance. This can be seen in many periods and areas in the past but it is important that meanings are also contextualised locally. The lack of much burial evidence in Iron Age Britain has also led to the suggestion that rivers were probably used as depositories for the dead which might be linked with the idea of the journey and rivers being liminal and pathways to the underworld (cf. Brück 1995). Sharples (2010: 273) has suggested that the apparent lack of evidence that much fish was eaten at this time could relate to a taboo if fish were perceived as having had a role in the funerary process by eating human flesh or guiding the dead to another world.

The phenomenology of places can also help us to consider the way in which water was experienced where there are few or no textual sources. Seascapes, and phenomenological aspects of the sea, have become a more popular area of study in recent years with an increasing emphasis being placed on the human experience of the sea as an element of the earth's surface and the distinctive modes of human behaviour, ways of living and identities that proximity to the sea can encourage (see Chapter 4; e.g. Rainbird 2007; Van de Noort 2011). On a smaller scale we can also consider the phenomenology of other elements of the waterscape including rivers, lakes and wetlands. On Iron Age rural settlements, for example, and similar settlement types that continued to exist in the Roman period, there appears to have been a close relationship between water and settlement. Many roundhouses had drainage gullies and there were sometimes some larger-scale systems of drainage ditches within settlements (C. Evans 1997), but it seems likely that there would have been standing water within the ditches at most times of the year and this water may well have been regarded as an integral element of the settlements (ibid.). Haselgrove and Millett (1997) have commented on the fact that many sites of apparent important activity in the Iron Age, such as at the *oppida* at Verulamium and Bagendon were deliberately located in low-lying watery areas as if the water played a significant role in the activities and ensured its importance. If so, there was a definite cultural difference towards water in the landscape than might be considered the norm today.[4]

The significance of different types of water also appears to have been recognised. There is evidence that the points at which fresh water and salt

[4] There may well also have been cultural differences between the way in which water was experienced between men and women. It is interesting to note here that amongst some peoples that live in the Amazon, torrential rains are considered 'male' whereas gentler rains are regarded as 'female' (Wohl 2011: 9).

water met, for example, seem to have been regarded as ritually significant and some of these points also became locations for shrines in the Roman period, such as at Sheepen outside the Roman town at Colchester (Willis 2007: 121–122). The area known as Sheepen lay around 0.75 km northwest of the town within the floodplain of the River Colne at the point at which it is joined by several tributaries and the lowest downstream point of the river which is non-tidal. A large concentration of Roman period shrines are known here suggesting that this zone was regarded as special (Crummy 1980: 252; Hull 1958: 230). Salt making itself is likely to have been regarded as a ritually significant act, as Lane and Morris' (2001) study of prehistoric salt making in the East Anglian Fenland has argued, undoubtedly as a result of perceptions relating to the transformation of water and the properties of salt.

Urban development in Roman Britain will have taken place in the context of these landscapes and cultural attitudes to water. Towns can be approached in terms of places where meaning is acquired through human activity, movement, interaction and memory (cf. Massey 2005; Simonsen 2003; Tilley 1994). They are foci for performative processes which continually add meaning to and reconstitute the significance of the sites (cf. Edensor 2000). Watery features will also have played a significant part in these processes. Phenomenology is also connected with issues related to the emotions that are invoked by places.

The cultural responses to watery contexts gave them a materiality in the landscape. The attitudes, motives and responses to various elements of water in the urban context can be considered in terms of reflections of identity and belief. Through examining the way in which waterscapes were used and altered within towns we can explore the active involvement or 'agency' of people as well as their relationship with the wider world (cf. Giddens 1984). Alterations to waterscapes have architectural properties: when rivers and other forms of water are experienced, negotiated and altered they become architectural features themselves. Architecture, and the technology used in its construction, is the product of social events and beliefs (cf. Dobres 2000; Tilley 1994). Architecture is highly symbolic especially in its relation to space: it can "create and bound space, create an inside, an outside, a way round, a channel for movement" (Tilley 1994: 17). All artificial monuments can define space in new ways and they do not necessarily have to be constructed for the purpose of using space inside them (cf. Bender 2001; Bradley 1993). We can explore different interpretations of the material evidence relating to waterscapes, the motives behind actions taken to alter waterscapes and the reactions that resulted from these activities.

A number of important studies within Romano-British archaeology have now sought to use structuration theory for the analysis of buildings and architectural space including Gardner (2007) *An Archaeology of Identity: Soldiers and Society in Late Roman Britain* and Revell (2009) *Roman Imperialism and Local Identities*. Both works emphasise the importance of the idea of the duality of structure and agent where social structure and individual lives are not seen as a dichotomy. The actions of everyday life reproduced the political structure and social system. Through theoretical frameworks such as this we can explore different interpretations of the material evidence relating to river and waterscape archaeology. We can examine the motives behind the actions taken to alter the waterscapes and consider the range of reactions that resulted from these activities. Theoretical frameworks allow us to begin to challenge our understanding and assumptions relating to the archaeological material (cf. Hodder 1986; Shanks and Tilley 1987), and advance our approach to urban archaeology and water.

Water and Urban Spaces: Cultural Meanings

Water has a materiality through its physical properties and through the human use, experience, control, management and distribution of water (cf. Rogers 2012; Strang 2008).[5] This materiality formed as much a part of the urban structure as public buildings, monuments, houses and roads and demands caution when archaeological study makes divisions between perceived 'natural' and 'artificial' components of settlements and landscapes (cf. Ingold 2000; Insoll 2007). The presence of water in modern towns and cities in the form of rivers, lakes, water pipes and sewers, however, does not mean that the values associated with water today can be used to interpret and explain Roman infrastructures, water use and experiences (cf. Koloski-Ostrow 2001a: 1). It is impossible for contemporary urban planners, designers and dwellers to think in the same way as their Roman period counterparts will have done because they were not operating under the same political, social and religious ideologies (ibid.). For the majority of urban dwellers today, moreover, rivers and other contexts of water, have become background elements which, if noticed at all, are regarded mainly for their aesthetic

[5] For works on materiality see, for example, D. Miller (ed.) 2005; 2009; and Hodder 2012.

appearance or practical value (cf. Haughey 2007: 119). Only an occasional event such as a flood after heavy rainfall might remind us of the constant presence of the underlying waterscape. The modern Western viewpoint attaches fewer values to rivers; today rivers are simply neutral settings and backdrops to which people live their lives. As components of the inhabited landscape they will also have formed part of events that took place in that landscape and associated with both its long-term continuities and shorter-term changes (cf. Mauch and Zeller 2008a: 2). As such they could form a focus of local history and identity but they can also change in course and character over time influencing their relationship with the land and the way in which they are experienced.

The different types of context, or source, of water that formed part of the urban topography will have been associated with different meanings connected with their characteristics and use; and this in turn will have an influence on aspects of the nature and identity of the settlements, fields, woods and people on their banks and in close proximity to them (cf. Herendeen 1986: 4). Attitudes towards the waterscape and the way in which it was treated and altered in the urban context will have been tied into the religious and other cultural values attached to the various watery contexts. Viewpoints will also have varied according to the cultural background of individuals.

Watery contexts in the landscape could have practical value but they also took on considerable cultural meanings especially relating to settlements with which they were associated. An obvious case study to illustrate this initially is the city of Rome itself since its relationship with water, and there are also textual sources to inform us here, has probably been the focus on more investigation than any other city or town. Whilst useful, however, Rome was clearly not a typical city in the Roman Empire because of both its cultural and political significance at the time and its surviving cultural legacy throughout later history. The location of the city of Rome can be studied in geological, geographical and economic terms (cf. Crouch 2004; Laurence 1999: 109), but many other social and cultural factors were also associated with this place including the values associated with watery contexts here. The Seven Hills of Rome are a well known and visible feature of the city but it can sometimes be neglected today just how central the River Tiber and its floodplain also are, and indeed were, to the city. The Tiber river basin is one of the largest in Italy and many tributaries to the north and east feed into it (Castagnoli 1969; Heiken et al. 2007). A number of its tributaries, not just the main river, weaved through the city (ibid.: 85); water, therefore, would have been a far more prominent and visible feature of the Roman period

settlement than it is today. There are also a number of important springs located at the base of hills either side of the Tiber which will have fed it (Holland 1961: 31).

There have been a number of studies that have examined the phenomenon of floods in ancient Rome caused by the city's location next to the Tiber; floods continued to be a problem until flood defences were constructed during the late nineteenth and early twentieth centuries (Aldrete 2007: 247–252). There has been a tendency to view occupation within the floodplain and the flooding of the river from modern perspectives of city planning and the inconvenience that it may have caused. Heiken et al. (2007), for example, state that damage from flooding during "Imperial Roman times was less devastating because of competent city planners, who placed facilities such as theatres and athletic training centres on the floodplain and located most residences above the rogue waters". Most analyses of the workings of ancient Rome draw on modern attitudes to planning, public health, safety and hygiene when there would have been a different set of attitudes and stimuli in operation in the past.

Some Roman authors wrote about the early conditions of Rome before drainage operations, although well after the events had taken place. It is likely that they will have been exaggerating the descriptions in order to improve their narrative and to emphasise the significance of the later changes; this also suggests that there was power and meaning in exaggerating the nature of the landscape. The Augustan writer Propertius (IV.9.5) refers to the land between the hills of Rome of being the site of a stagnant body of water through which boats travelled. Varro (*Ling.* V.43–44), writing also in the first century BC, also describes central areas as being nearly submerged beneath swampy pools and streams, necessitating boats. There have been some useful studies examining the literary and archaeological evidence of the methods used to reduce the difficulties caused by flooding in Rome (Aldrete 2007; Ramage 1983). Dredging was one of the methods which cleared the channel of the Tiber and could make it deeper to increase the flow of water (Aldrete 2007: 190). Suetonius (*Aug.* 30.1) records in his second century AD work that Augustus initiated some dredging projects and attempted to clear obstructing buildings that impeded the flow of the river. There are also references to a Tiber Commission, 'supervisors of the river bed and banks of the Tiber' (*curatores alvei et riparum Tiberis*), which was established by the Emperor Tiberius according to Tacitus (*Ann.* I.76, 79) and Cassius Dio (LVII.14.7–8). Embankments were constructed in the Roman period but it appears that these did not form a systematic and continuous line along the river and they were principally connected with providing port facilities (cf. Aldrete 2007: 196; Aldrete and

Mattingly 2000). It does not seem, then, that any serious attempts were really made to prevent flooding through the embankment of the Tiber in the Roman period, although there would certainly have been the technology to do so.

Rather than embanking the river, it appears that more effort was made to fill land and to raise buildings out of the danger of inundation; the use of monumental stonework in building would also have reduced the impact of flooding on the structures (Aldrete 2007: 177–180). The construction of the Forum Romanum saw one of the early attempts to reclaim and consolidate land and build in a monumental scale away from the risks of floodwaters (Ammerman 1990). The consolidation of the land required the dumping of fill on a massive scale and this form of transformation of the landscape represented an act that was as monumental and significant as the construction of buildings on top. It appears that the Romans were more willing to transform the land surrounding the Tiber than the river itself. Through his useful study *Floods of the Tiber in Ancient Rome*, Aldrete (2007: 217–224) has demonstrated that flooding of the Tiber appears to have been considered at least partly in terms of divine intervention and consequently there were attempts made to placate the gods at times of floods. Regarding the floods of 193 BC, for example, Livy (59 BC–AD 17) records that amongst other actions taken, the Sibylline Books were consulted and a nine-day sacrifice was enacted (XXXV.9.2–6). It is also possible in some cases that floods provided useful opportunities for urban renewal allowing for further development. There may also have been different attitudes towards the inconvenience of floods within the city (cf. Aldrete 2007). The Tiber and other sources of water in and around Rome were intimately connected with the city and the way in which people lived their lives (cf. Kosso and Scott 2009a: 2; Meyers 2009: 233). The cityscape consisted as much of elements of water as of land and buildings; and water would have been an important aspect of the identity of the inhabitants and the meanings that they ascribed to the city as a place in the landscape.

As places, cities are, and were, embedded with the accumulated historical events, memories, stories and myths which influence city and occupant identity as well as the way in which the settlements are experienced (cf. T. Hall 2006; Massey 2005; Simonsen 2003). Water is a common aspect of many origin myths including those relating to settlements (cf. R. Taylor 2009). The apparent longevity and continuity of rivers over time would perhaps mean that they could be regarded as one of the oldest visible components of settlements and, as such, rivers can be used as symbols of their first beginnings and can provide a focus for communal memories (cf. Herendeen 1986: 8). It seems that Augustus, for example, was sure to emphasise the Tiber

in the origin myths constructed for Rome, reflecting his desire to possess control over this component of the city as well as its buildings and inhabitants (Livy I.4; Plut. *Rom.* III.4; Verg. *Aen.*; cf. Morwood 1991; Rea 2007).[6]

There are no texts referring to any origin myths relating to the towns of Roman Britain but it seems likely that many settlements would have had myths relating to historical or mythological knowledge of the places where they were located. This can be glimpsed at, to some degree, in the study of place-names which as a subject has a long history (cf. Rivet and Smith 1979: 1–10) and has been popular in the study of landscape history (cf. Johnson 2007). The complexity of the subject means that language specialists are needed for this work. The volume by Rivet and Smith (1979) *The Place-Names of Roman Britain* remains the definitive study for the Roman period in Britain although it is now over thirty years old and could undoubtedly be updated. Though only providing limited information, names can reflect long histories and attitudes towards places. A well-known example is that of the fortress at Chester which took the name *Deva* which probably derived from the name for the river and goddess there, known as the Dee today (Mason 2001: 27; Rivet and Smith 1979: 336–337). Mason (2001: 27) has argued that adopting the name from the river meant that there was no pre-existing settlement here. The name, however, suggests that the river and this place was probably already significant and this was then negotiated with the construction of the legionary fortress. The transferral of a river name to a military site is also known in other instances including at Exeter (*Isca Dumnoniorum*) and Caerleon (*Isca*), with *Isca* deriving from 'water' in the sense of a 'river' (Rivet and Smith 1979: 376–378), and contributing to the present form of the river names Exe and Usk.

Some of the names that we have for Roman towns in Britain reflect the pre-existing landscape in some way and suggest that there were similar negotiations between new settlements and existing places. Although the derivation of the name *Corinium* (Cirencester), for example, is still not entirely clear Rivet and Smith (1979: 321) have suggested that it may originate from a botanical feature, probably some of kind of tree growing here. It may be that there were originally trees on the thin gravel spine/island between the rivers on which the town developed—perhaps a sacred place

6 One common trend in myths relating to rivers is for the hero or heroine to die in or near a watercourse and to be resurrected as a new personification of the river itself (R. Taylor 2009: 23). According to tradition, the river took its name from Tiberinus, a descendent of Aeneas who drowned whilst attempting to cross it (Livy I.3; Verg. *Aen.* VIII.330–332; cf. Dyson 2001: 67).

that was altered with the construction of the town. The name *Calleva* (Silchester) has been interpreted as meaning '(town in the) woods' (ibid.: 291). With trees being fed from groundwater, the late Iron Age earthworks here perhaps defined an important area imbued with meaning and symbolism which was further enhanced through the construction of the town here and the importance attached to the use of wells. The name for the Roman town at Canterbury, *Durovernum Cantiacorum*, appears to relate more directly to the wet conditions of the area with '*verno-*' from *Durovernum* meaning alder-swamp or marsh and was clearly already an important place before the Roman conquest (ibid.: 353). It seems likely that many of the places that became settings for towns and other settlements in Roman Britain will have witnessed a dynamic negotiation of myth, power and identity drawing on existing meanings and new ideas brought to the sites.[7] This process can also be examined by looking at the context in which land transformation associated with towns and altering waterscapes were situated. The significance attached to these places will have influenced the responses to their alteration. Archaeology is continuously improving our knowledge of the way in which the settings of towns in Roman Britain were already being used before urban development. Towns would not have been situated in unused or mundane landscapes since they will have acquired meanings even if there was not always much evidence of permanent settlement. In the words of Thomas (1996: 83): "places are always already place-like as soon as we are aware of them, use them, and consume them". The significance of these places can include the values, uses and histories that were associated with rivers, lakes, springs, marshes and other watery contexts as well as the rich plant and animal life that they encouraged.

The rivers, wetlands, lakes and other features that formed a part of these places also became significant elements of urban topographies as towns were founded and constructed. In the Iron Age, it could be argued that the construction activities were more sympathetic to the landscape including rivers and other watery contexts. It is only in the Roman period that these features began to be altered significantly for the first time through events

[7] Contemporary works of fiction, poetry and studies of modern history have also explored rivers as elements of events, identities and social change (e.g. Magris 1988; Mauch and Zeller eds. 2008b). For these writers, the rivers are not neutral backdrops but essential aspects of the landscape which can form a focus for events and identities. They also offer an alternative view of understanding and experiencing rivers, and other elements of waterscapes, that are not dominated by scientific endeavour.

examined in this book including land drainage, river canalisation and the construction of waterfront installations. These landscape events, however, also formed significant components of the biography of these places. The theme of drainage has been an important subject in Roman urban studies but mainly from the perspective of civic infrastructure in the form of pipes and sanitation rather than taking a landscape perspective (cf. Wilson 2000a: 151). Back in 1981 Salway (1981: 555) stated that we "have a great deal to learn about how the creation of cities ... (interfered) with the natural pattern (and) affected the environment". This could still to some extent be argued to be the case although there is now considerably more data available from excavations to examine settlements in terms of landscape change and their relationship with water. It is important, however, not to study these themes purely in technological terms but to consider the social significance of water and human actions connected with it.

The Chapters of the Book

The chapters of this book will examine the relationship between towns and water through frameworks of analysis drawing on different branches of archaeology. Rivers form a major interest in geography, but also geoarchaeology, whilst the study of waterfronts, including port and harbour installations, riverfronts, coastlines and shores, constitutes a significant area of study in maritime archaeology where research has been moving away from descriptive approaches treating shipwrecks, cargoes and other remains in isolation to the more holistic approach of the maritime cultural landscape. Wetland archaeology forms another specialism where again there has been a development away from the predominance of descriptive approaches to examining excavated material towards more analyses of the social significance of wetlands and wetland use.

The waterscapes of many of these towns have changed considerably in more recent times as a result of urban growth, river canalisation and the creation of drainage and sewer networks. The urban waterscape has been transformed according to the social attitudes of each generation (cf. Barty-King 1992; Borsay 1989), and this cultural context influences the way in which we approach waterscapes in the more distant past. This means that in order to understand the relationship between land and water in the urban context in Roman times, and how waterscapes were acted upon as part of the settlement, it is necessary to be able to reconstruct, where possible, the early waterscapes. Chapter 3, therefore, examines, as archaeological entities, the way in which

rivers, lakes, pools and other watery contexts have changed in urban contexts and how they would have been in the Roman period. Through analysis of the available archaeological evidence it is possible to identify earlier courses of rivers and streams and the location of marshy areas, lakes, pools and islands. These features were significant elements of these early landscapes and urban developments but many have now been completely lost, such as at Lincoln (e.g. Stocker ed. 2003) and London (e.g. Cowan et al. 2009). This is not simply an exercise in topographic reconstruction (cf. Crouch 2004), because each component of these waterscapes will have been imbued with meaning through human action and experience which is just as important as the physical evidence itself.

One major reason for the way in which the relationship between urban spaces and rivers changed was the deliberate diversion of rivers. Whilst the technical considerations and practicalities will be addressed, the social implications of the river changes will be emphasised including how reactions to the changes related to contemporary attitudes to water and the different contexts in which water is found. The significance associated with these alterations to rivers and their relationship with the land will also have been connected with the longer-term meanings and histories attached to individual places. Whilst rivers may have been diverted to reduce the risk of flooding within the settlement, or to channel the water for a specific purpose, the act of transforming the land and moving water would have been imbued with many cultural meanings. Waterways are often important elements of settlements but they are not always altered in any major way. Artificial changes to rivers can be considered in the context of Roman urban development but also in the wider context and history of landscape alteration. Examining the materiality of rivers in towns not only provides further knowledge relating to the urban experience but also helps us to bring new perspectives to the wider discipline of wetland archaeology and the archaeology of water.

Another important element of waterscapes is the point at which land and water meet—the interface between water and land, such as shorelines, the edges of lakes and pools and riparian zones. For rivers, seas and wetlands this meeting point between land and water can be in a constant state of flux; it is often a point of uncertainty and changeable, unknowable and dangerous. It is the point from which contact with the water is made and journeys are begun (cf. Rainbird 2007; Westerdahl 1992). These interfaces can be just as important in settlement contexts as they are in coastal and rural settings and they are often altered through the construction of waterfront installations often in the form of ports, harbours, jetties and other structures. These artificial structures

and their impact on waterscapes and the experience of the land/water interface are the subject of chapter 4. The study of ports and harbours is a popular area of Classical Archaeology and they often form a significant part of studies of past economies, trade and cultural contacts (e.g. Dietler 2005; Milne 1985). But we can also think about ports and harbours in terms of the physical structures themselves, the social significance of construction and their social impact on the landscape. Waterfront construction was an important aspect of the way in which waterscapes were altered and their involvement with, and the manipulation of, water could give them meaning beyond their practical function. Waterfronts were also unique environments evoking different experiences from those further inland. The construction of waterfront installations could be as monumental as urban public buildings and they perhaps represent a specific attitude regarding what is physically possible when it comes to changing land and manipulating and controlling water.

Another aspect of the way in which waterscapes interacted with urban space is in the presence of wetlands and other marshy areas in urban contexts. This relationship between water and land could change through wetland drainage and land reclamation. The study of wetlands has predominantly been the preserve of rural landscape archaeology (e.g. Allen 1997; Rippon 1996; 1997; 2000a). For Roman Britain much of the focus of study has been on coastal wetland transformation especially where there is good preservation of activity, as in the Severn Estuary and the coast of southern Wales (e.g. Allen and Fulford 1986; Rippon 1997; 2000a). The medieval and post-medieval periods saw large wetland drainage projects which transformed the landscape on a major scale and turned it over to agriculture and other uses as part of the increasing drive to 'improve' and 'rationalise' the land (cf. Darby 1983; Purseglove 1988; Tarlow 2007; Williamson 1999). Chapter 5 examines the way in which wetlands, including river floodplains, formed integral parts of urban landscapes in Roman Britain. In some cases these wetland areas were drained and land was reclaimed through dumping material and consolidation. These activities formed a significant element of land alteration in the Roman period and in some cases can be seen as a significant element of the monumentalisation of the townscape. The draining and building-up of land, moreover, will not have been mundane activities but will have had meanings reflecting the cultural significance of water and land change. Not all wetlands within urban contexts were drained, however, and there is evidence that flooding could be a continued problem within some towns, such as Canterbury (Pratt and Sweetinburgh 2004). This suggests that modern notions of practicality and convenience need not necessarily be applicable to

our understanding of town planning and development in the Roman period and we need to explore other cultural meanings behind landscape use in the urban context.

Through this analysis of the various watery components of the landscape and their relationship with urban space, it is important that the way in which the waterscape as a whole came together in these contexts is not forgotten. The next chapter, then, will examine five case studies of urban waterscapes in Roman Britain before breaking the components down and analysing them in the chapters that follow.

CHAPTER TWO

FIVE URBAN WATERSCAPES

Introduction

As discussed in Chapter 1, there is a large range of different components of waterscapes including oceans and seas, rivers, streams and other water courses, waterfronts, shores and coasts, lakes, ponds and pools, springs, marshes and other wetlands and also groundwater. In urban settings the components of waterscapes come together in different ways to form an element of each unique town biography and they are used and altered in various ways as the spaces develop and change. They have an impact on the urban experience as much as other elements of both the natural topography and the built environment including roads, buildings and other structures. This chapter will examine five examples of the relationship between town development and waterscapes in Roman Britain. Each of these examples of towns have a range of different relationships with water in the landscape. The information presented here attempts to avoid too much descriptive detail and instead aims to provide a way into discussion and analysis that will follow in the next chapters.

The Context of Urbanism and Waterscapes in Britain

The process by which towns developed in Roman Britain has been the subject of much investigation and it is increasingly being recognised as multi-faceted. Once seen mainly in terms of military strategy and expansion of control (e.g. Frere 1967), the urban settlement pattern in Britain is now considered more as the result of a range of negotiations including those between military strategy, developing communications networks, local developments by elites (perhaps competing for power and with some influenced by Rome) and other processes (e.g. Creighton 2006; Mattingly 2006; Millett 1990). Urban development will have been a nuanced process because of the range of different viewpoints and attitudes associated which each place that will have existed amongst local peoples and incomers, whether officials, the military or civilians. Towns may well also have always been fairly unusual

settlements in Britain because of their pro-Roman stance, by the elites at least, although this does not mean that the way in which these spaces were experienced would not also have drawn on pre-existing values and meanings associated with these places. The development of towns has conventionally been categorised according to whether the settlement was associated with a military establishment or a late Iron Age *oppidum*, but it could also be argued that towns will have formed part of landscapes with longer histories and meanings (biographies) regardless of the type of pre-existing settlement or military activity (cf. Rogers 2008).

There are many important publications examining the function and meaning of *oppida*, the possible role of late Iron Age elites in their development and the association between these *oppida* and the towns that followed (e.g. Creighton 2006; Millett 1990; T. Moore 2006). It is clear, however, that there still remains considerable uncertainty about the circumstances around their development, their purpose and whether they should all be grouped under the same term (e.g. Collis 1975; 1984; Cunliffe 2005; Haselgrove 1990; Sharples 2010). Indeed, our improving knowledge of each urban biography and origins is suggesting that there may have been more difference in the function of these earthworks, their developments and associated settlements and activities, than has been recognised in the past. There were also *oppida* that did not eventually become the sites of Roman towns, such as Stanwick in North Yorkshire (Haselgrove et al. 1990), although it could be argued that they can be seen in terms of an alternative trajectory of urban development but one that ultimately did not survive.

An additional perspective, moving beyond that focusing simply on the question of Roman urban development, is that we can also look at *oppida* in terms of monuments that altered land through their construction and the way in which these landscapes were experienced. If we are to give more attention to the relationship between urban spaces and water in the Roman period, breaking down traditional divisions of study, it is also important to consider the relationship between *oppida*, and other types of settlements, and the acculturated landscapes in which they were set. *Oppida* are not known in the vicinity of every Roman town in Britain but where they are not found there is often evidence of some kind of settlement or activity taking place. This suggests that there may well have been issues relating to land ownership and tensions connected with the alteration of land as towns developed that are now hard to define. With the development of the Roman *colonia* especially much of the land in the immediate vicinity of the town is likely to have been confiscated from local people whilst with the *civitas*-capitals it may have remained under local control but perhaps with increasing tensions amongst

peoples as to how it was used. Towns were located within pre-owned and settled landscapes which is likely to have had an impact on the sensibilities of local peoples.

Earthworks are usually considered to be one of the defining components of *oppida*, establishing whether they were what have been termed 'enclosed' or 'territorial' *oppida* (Haselgrove 1990: 121). Whilst the 'enclosed' *oppida* have earthworks that appear to define an identifiable internal area, such as Salmonsbury and Bagendon in Gloucestershire and Bigbury in Kent, the 'territorial' *oppida* earthworks are discontinuous and cover larger areas of land; these include Verulamium and Camulodunum. The conventional interpretation of *oppida* earthworks has been to regard them as defences (e.g. Collis 1975), but rarely do they appear to make sense in these terms. With discontinuous earthworks especially it is difficult to know what the earthworks were constructed to demarcate or define (Haselgrove and Moore 2007: 6). What is clear, however, is that they were highly monumental constructions and statements of purpose in the land. Sharples (2010: 173) has argued that the earthworks did not need to enclose anything because these places did not symbolise a community in the modern sense. Local people did not see themselves as belonging to a single indivisible community distinct from other communities; instead they were bound together by networks of personal allegiance (cf. T. Moore 2011). *Oppida* were perhaps places where people gathered, passed through and conducted meetings and ritual activities. For Bagendon near Cirencester, T. Moore (pers. comm.) has also placed an emphasis on the role of the earthworks in animal corralling.

It is often argued that rivers and wetlands were used as boundaries between tribal or group territories (e.g. Cunliffe 2005), but without written records it is very difficult to support this. If tribal entities were less fixed at this time, moreover, this concept of the tribal boundary may not be suitable but it does not mean that watery contexts did not acquire meaning in the landscape. It appears that rivers and other watery contexts often formed integral components of *oppida* including Verulamium (St Albans), Camulodunum (Colchester), Chichester and Bagendon suggesting that they were imbued with cultural meanings. Marshy areas were sometimes associated with coin production and other metalworking activities (cf. Haselgrove and Millett 1997; Hingley 1997a). There will have been a practical necessity for water in these activities but the metalworking will also have had symbolic meanings which may have suited these ritualised watery places.

The way in which the earthworks wove through the landscape, moreover, is perhaps not unlike rivers themselves. To the north and east of the site of the Roman town at Chichester, for example, is a series of 15 linear

bank-and-ditch earthworks known as the 'Entrenchments', some of which run north-south, projecting down to the area of the later Roman town, whilst others run east-west. Some have been partly excavated but the dating of the group is still problematic. The northernmost of the east-west entrenchments north of Chichester is the Devil's Ditch extending westwards from the River Lavant towards the head of the Bosham stream, but the excavation did not produce any finds for dating purposes (Bradley 1971; Hamilton and Manley 1999; Magilton 2003: 156–159). From what is known from excavations it is likely that the earthworks were constructed over a fairly prolonged period probably between the first century BC and the early first century AD (Manley et al. 2008: 44). The dykes must be important for our understanding of the area in the late pre-Roman period before the Roman town was constructed but nothing definite is known about their purpose. Suggestions as to function have included the need to divide up land, hinder the movement of stock or provide security (Magilton 2003: 156–159). If they did have some kind of defensive role it is clear that they did not form any kind of enclosure but, like rivers, they did divide up land in a physical way. What is striking is that there were a large number of rivers running north-south to the sea across this landscape, including the Lavant, and tributaries of these running to the west and east (Hamilton and Manley 1999: 22). The earthworks may have functioned in association with the rivers, in some way perhaps dividing the landscape.

A similar argument could be made for the earthworks at Verulamium and Camulodunum. At Colchester there are a number of dykes mainly to the west and south of the site of the Roman town which vary in date, depth and length. The earliest may have been the Heath Field, Lexden and Sheepen dykes dating to around 25 BC. New earthworks also apparently continued to be built after the Roman conquest and into the AD 60s (Hawkes and Crummy 1995). These earthworks formed monumental alterations in the landscape and to some extent divided it up. Rivers were also regarded as boundaries, both practically and symbolically, (Braund 1996a) and one possible interpretation could be that the earthworks mimicked the rivers in order to define this area in the landscape where special activities took place. At Verulamium there are also a number of discontinuous earthworks including the Beech Bottom Dyke and the Devil's Ditch/New Dyke; smaller ditches include those named White Dyke, Prae Wood Ditch, Wheeler Ditch and Folly Lane Ditch (Thompson 2005: 27–32; Wheeler and Wheeler 1936: 227). Whilst the Beech Bottom Dyke has not been excavated, the Devil's Ditch was possibly dated to the mid-first century BC and the others were of early first century AD date (Thompson 2005: 27–32). Again these ditches do not appear to form any recognisable enclosure

but they do represent monumental alterations of the landscape and focus on the River Ver; they could perhaps even being regarded as tributaries of the Ver winding through the landscape, whilst the river itself remained unaltered in any major way.

The river and its floodplain formed as significant a component of the *oppida* as did the earthworks. There was a causeway, known as the 'Timber Tower', built over the River Ver. The remains consisted of three rows of timber uprights driven into waterlogged peat. Some timbers were large and squared whilst others were thinner and rounded; posts supported horizontal timber planks. A bronze *patella* and a late pre-Roman Iron Age black ceramic bowl were found below the posts which may have been ritual deposits (Anthony 1970; Niblett 1999: 411). Other possible ritual deposits included pre-Claudian and Claudian coins, brooches and fragments of cavalry helmets. A large quantity of coin moulds was found in 1992 during a watching brief in the peat near the trackway which may also have been deposited ritually (Niblett 2001: 61).

Waterscapes, then, were important elements of cultural landscapes and this is also important for considering meanings associated with town locations that do not appear to have been sited near *oppida*. At Lincoln, for example, although there was a fortress and major road system meeting here it is also important to recognise the pre-existing values and activities associated with this location and it appears that much of this value was connected with the waterscape here. In prehistory there was a causeway across the River Witham at Stamp End from which there were depositions made into the water. More than 24 finds of high quality metalwork came from here (Stocker and Everson 2003; M. Jones 2003: 22). Twenty of the finds were of late Bronze Age or Iron Age date and included Bronze Age swords, axes and spearheads as well as the famous Iron Age Witham Shield. These were clearly votive offerings similar to those found at other causeways (Bradley 1998; Field and Parker Pearson 2003; Fitzpatrick 1984; Pryor 2001). Well-known prehistoric items of metalwork and human skulls have also come from the Thames and its tributaries indicating the significance of this waterscape (Marsh and West 1981; Merrifield 1987; Sidell 2008; York 2002). At Dorchester the religious significance of the River Frome in association with the town is suggested by the large number of votive deposits that have come from the river mostly during the process of lowering the riverbed in the nineteenth century (King and Woodward 2003: 152). The finds included over 400 coins and rings, fibulae and other metal items.

At Gloucester it appears that there may have been a pre-existing settlement in the Kingsholm area although this is still contentious (Hurst

1999; Timby 1999). Near the Kingsholm fortress, excavations at the site of Coppice Corner revealed substantial traces of ditches and pits and material that included Iron Age coins and late Iron Age/early Roman pottery (Hurst 1985; Hurst 1999: 119; Timby 1999). Unfortunately the site was investigated through rescue excavation in difficult conditions and so there remains considerable uncertainty about its origins, development and nature. The available dates of the pottery, moreover, could either indicate that the settlement was in existence before the construction of the Kingsholm fortress, it perhaps being a motive for its foundation, or that it may more simply have been connected with the development of the fortress itself (Timby 1999).

London

Introduction

The Roman period town at London lies roughly beneath the area of the modern City of London and on the opposite side of the Thames at Southwark. On the northern side of the Thames are two small hills, the eastern hill, Cornhill, and the western hill, Ludgate Hill. Between them flows the Walbrook Stream into the Thames. As noted in Chapter 1 there has been some debate about whether there was an early fort or temporary encampment established in the Cornhill area in the AD 40s which then developed into the beginnings of the town in the early AD 50s (Perring 2011). This interpretation of the evidence is not widely accepted (cf. Wallace 2011), but it might suggest some kind of early settlement activity here. To the west of the Walbrook there is also some evidence of early possible civilian occupation including a number of timber roundhouses at the Gresham Street site, Toppings Wharf and Newgate Street (Hill and Rowsome 2011: 272–275; Perring and Roskams 1991: 74; Watson et al. 2001: 13; Museum of London Archive number GSM97). On the south side of the river at Southwark there has also been debate regarding the military presence here and there are also traces of possible Iron Age activity (see Rogers 2008). What is clear, however, is that most studies relating to the origins and development of London and the interpretation of the often difficult material remains have been dominated by the dichotomy between military/strategic and economic considerations. Whilst both are important it is also important to acknowledge the pre-existing significance attached to the landscape and the way in which water formed a major component of the settlement structure and the town's development.

The 'Lost' Rivers of London and the Changing Waterscape

The waterscape of London has changed considerably over hundreds of years of occupation, not least in the way in which river and stream courses changed, became less visible or were lost altogether. The subject of these rivers has seen a comparatively large amount of study (e.g. Barton 1962; Foord 1910; Ormsby 1928).[1] Some of these losses were associated with the massive expansion of London in the post-medieval period but there were also a number of rivers that would have formed a more immediate part of the Roman town and have since been lost or now lie beneath the city surface. There has been considerable archaeological work over the past thirty to forty years within the area of the Roman settlement which has made it possible to go some way to recreate the townscape and it is clear that there were a number of rivers that formed significant features of the urban topography on both sides of the Thames (cf. Cowan et al. 2009; Maloney 1990; Wilmott 1991). The course of the Thames itself does not appear to have changed radically from Roman times, although the river has been narrowed and straightened over the course of two millennia of settlement. Excavation work has demonstrated that there were marshy areas along the north side of the Thames which would have been inundated by the tide, but these have since been filled in (Milne 1985: 81–84; Sidell 2008: 68; Williams 1993: 6). It appears that well into the Roman period stretches of the waterfront would have been waterlogged and colonised by reeds and sedges creating areas with distinctive environments, as was noted on the Baynard's Castle site on the waterfront (C. Hill et al. 1980: 35).

Land on the north side of the Thames included a number of watercourses cutting through it and a spring line which discharged water down to the Thames (Figure 2.1; Rowsome 2008: 25; Williams 1993: 6). Probably the best known of these rivers is the Walbrook which ran through the Roman town west of the *forum* and effectively split the settlement into two, entering the Thames just to the west of where Cannon Street is today. The river still flows in a reduced form but now runs under the modern street level. In the Lower and Middle sections of the Walbrook Valley, the river appears to have consisted of just one channel but further upstream in the Upper Walbrook Valley the river system became more complex and consisted of a number of branches and smaller streams and brooks amidst a wider marshy landscape (Maloney 1990). Important excavations in the area of the Middle Walbrook Valley at Bucklersbury House (the site of the mithraeum), indicate that the

[1] Indeed, individual books could be written on the changing waterscapes of most of the towns and cities in this study.

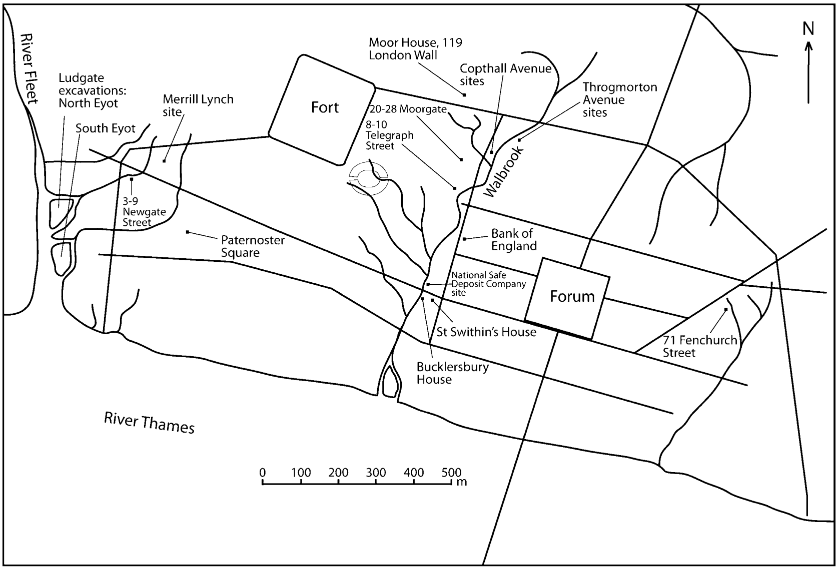

Figure 2.1. Plan of the reconstructed waterscape in association with the Roman town at London on the north side of the Thames (drawn by A.C. Rogers; adapted from Bateman 1998)

valley consisted of a broad, shallow depression about 91.5 m wide. With the fluctuations of the tides, it has been suggested that the width of the actual stream could have varied from around 3–13 m (Shepherd 1998: 216). Grimes' assessment of the evidence represents to some extent his surprise regarding the conditions of the valley; a reaction which probably relates to the image he had of how an ideal classical town should appear: "birch and alder thickets ... would no doubt have been its natural vegetation—certainly a curious set of conditions for an area at the centre of the main city of the province" (1968: 97). Plants, especially those associated with wet conditions, were probably significant aspects of many other urban topographies such as Canterbury, Lincoln and Cirencester.

More recent excavations near the Bucklersbury House site in London, at 1 Poultry (Hill and Rowsome 2011; Rowsome 2000), were able to study the environmental evidence in more detail and demonstrate that around the time of the Roman conquest the marshy vegetation on the river edge included alder, rush and sedges, with areas of bracken and rough grassland. There were also trees including lime, oak and hazel together with some evidence of birch, elm, holly, willow and beech which probably grew on and above the sides of the valley (Saife 2011; Sidell 2008: 64). Sidell (2008: 62) has argued

that without studying botanical remains such as this, towns are lifeless and colourless; the same could also be said for the waterscapes that fed many of these plants as well as contributing considerably to the sights, sounds and smells of towns in their own right. The 1 Poultry site lay close to the main east-west crossing point of the Walbrook within the town where the road was bridged with a timber drain dating the earliest activity to AD 47 found beneath the road (Hill and Rowsome 2011). The buildings established along this road were of a commercial and residential nature, including workshops, and the crossing point formed an important topographical feature within the town (ibid.). Close to the Walbrook industries used the water and there is evidence of wells, sumps and reservoirs for water extraction, storage and disposal (ibid.: 321–329). What has been labelled Tributary 1 of the Walbrook flowed through the corner of the site and it joined the main channel of the Walbrook at the Bucklersbury House site (ibid.: 251–254). These tributaries and roadside drainage ditches formed important elements of the streets and urban experience and are likely to have been crossed with timber planks or other methods.

Detailed analyses of excavations in the Upper Walbrook Valley by Maloney (1990), Butler (2006) and Seeley and Drummond-Murray (2005), and on the site of the Roman amphitheatre (Bateman et al. 2008), have done considerable work in reconstructing the immediate pre-Roman and early Roman waterscape in this area. The excavations have not identified a main course of the Walbrook in the Upper Walbrook Valley and instead it appears that tributaries collected together here and formed a single watercourse in the Middle Walbrook Valley (Wilmott 1991: 15). Traces of water courses were found at a number of excavation sites in the Upper Walbrook Valley (Maloney 1990; Butler 2006; Butler et al. 2009; Leary and Butler 2012) including 15–35 Copthall Avenue, 4–6 Copthall Avenue, 23 Blomfield Street and 9–19 Throgmorton Avenue and 22–25 Austin Friars, 12 Throgmorton Avenue (Drapers' Gardens) and 6–8 Tokenhouse Yard, but the exact routes of their courses remain difficult to establish. Excavations at Moor House, 119 London Wall, just to the north of the Roman town walls observed a number of probable stream channels on the eastern part of the site which are likely to have been tributaries of the Walbrook (Butler 2006: 7–8). Since the old streams are only ever observed in small sections on the sites of excavations, their courses are often being revised as new sites are opened and more information is gathered (e.g. Seeley and Drummond-Murray 2005: 9). It is uncertain whether a complete picture will ever be known because of the scale of urban change since the Roman period. The amphitheatre was located within the upper area of the town and sited on a spot of low ground crossed

by some small tributaries of the Walbrook Stream (Bateman et al. 2008: 16). At least three tributaries (what have been labelled Tributaries 1–3; with Tributary 1 conjectured to join the channel on the 1 Poultry site) were identified crossing the excavation site of the amphitheatre at the Guildhall which will have joined the Walbrook. In their analysis of the excavations, Bateman et al. (2008: 16) made the important point that despite their small size, these stream courses, combined with slopes of the natural ground surface, probably had a significant influence on the development of the area in the early Roman period.

As well as the Walbrook, there were a number of other rivers or streams on the north side of the Thames which formed aspects of the settlement topography. To the west of Ludgate Hill immediately outside the western course of the town walls, was the River Fleet which was a larger tributary than the Walbrook and had a steep river valley (Hunting 1993: 7). It entered the Thames in the area of what is now Blackfriars and its mouth is thought to have been up to 180 m wide at the time of the Roman conquest (Watson 2006: 9). It remained a focus of activity until it was canalised at the end of the seventeenth century and gradually covered over so that it now lies well below street level (Hunting 1993). Excavations at Ludgate were able to record some of the natural topography and identified that there were two eyots lying alongside the east bank of the Fleet; the first lying under Ludgate Circus and the second lying immediately to the north of this in the area of Fleet Lane (ibid.).

Within the line of the walls on the western side of the town are traces of a more enigmatic watercourse (or watercourses) often referred to simply as the 'Western Stream'. There has been considerable discussion concerning the nature of any water courses here and there remains much uncertainty (e.g. Bentley 1987; Lyon 2007; Marsden 1963; Pitt 2006; Shepherd 1988; Tyler 2000; Watson 2006). In 1908–1909 work during the construction of the General Post Office to the north of Newgate Street identified what were interpreted as two stream courses (Norman and Reader 1912: 275). To the south of this site at Paternoster Square in 1961 a single channel was observed and Marsden (1963: 75) interpreted this as representing the two streams coming together and forming a north-south flowing stream, which headed towards the Thames, and a number of additional branches that flowed off to the west and east. More recent excavations at Paternoster Square, however, were unable to support Marsden's arguments and it now seems that the natural stream did not cross this area to reach the Thames; Marsden instead may have found an artificial drainage channel or possibly a smaller tributary (Watson 2006: 12). Excavations at the sites of 3–9 Newgate Street and the Merrill Lynch Financial

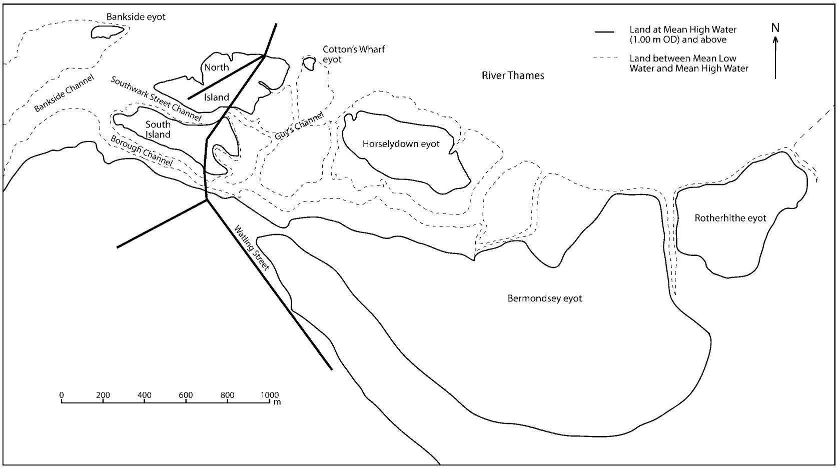

Figure 2.2. Plan of the reconstructed waterscape at Southwark (drawn by A.C. Rogers; adapted from Cowan et al. 2009, figure 4)

Centre, also around Newgate Street, suggest that the stream was probably around 5 m wide and that it fed into the Fleet coming from higher ground to the east (Pitt 2006: 46; Lyon 2007). A number of Roman culverts have been found on the Thames waterfront on the western side of the Walbrook which represent water channels running down to the Thames but in these cases it is still uncertain whether they were natural or artificial water courses (Williams 1993).

To the east of the *forum-basilica* complex and Cornhill, another river valley or stream is known in the area of Fenchurch Street and it is thought that the surrounding marshy ground may be the origins of the Fen component of the name (Bentley 1984; Bluer and Brigham 2006: 9). A thirteenth century deed refers to a watercourse in the area known as the Lorteburne, whilst it is referred to as Langbourne in the seventeenth century (see Bluer and Brigham 2006: 9). Excavations at the Lloyds Register of Shipping site at 71 Fenchurch Street in 1996–1997 identified a shallow stream which was probably a tributary of the Lorteburn (ibid.: 63) and indicates that water courses also formed a part of the topography of this part of the town.

Across the Thames at Southwark there has also been considerable archaeological work over the past forty years or so reconstructing the prehistoric and Roman topography and it clear that this area of land, even more so than the north side, was dominated by water (Figure 2.2). Southwark at the time of the Roman conquest consisted of a number of sand and gravel eyots or

islands within the Thames and analysis suggests that they had probably begun forming in the early Holocene (Sidell et al. 2002: 7). Around the eyots were the braided channels of the Thames and the courses of these have been reconstructed by excavations in modern Southwark. The principal courses are the Southwark Street Channel, the Borough Channel, Guy's Channel and Bankside Channel, named after sites or areas in which they were first identified (Cowan 2003; Cowan et al. 2009; Sheldon 1978; 2000; Taylor-Wilson 2002; Yule 1988). The largest island which saw the majority of the settlement in the Roman period was the north island. To the east of this island and Guy's Channel were two smaller islands which were known as Horseleydown and Bermondsey in the medieval period (Heard 1996). To the south of the Borough Channel lay the mainland south of the Thames whilst to the east, as the Thames curved round the Southwark islands, lay another sand eyot known as Thorney Island which is now famous as the site of Westminster Abbey and Palace (C. Thomas et al. 2006; C. Thomas 2008). The River Tyburn also fed into the Thames here but its exact course is now uncertain (C. Thomas et al. 2006: 9).

Islands clearly formed a significant component of the urban topography in the Roman period. The exact status of the Southwark islands in relation to the settlement on the north side of the Thames is unknown and has been the subject of much debate (e.g. Heard et al. 1990; Yule 2005), but there was considerable settlement here which included the construction of monumental buildings and a temple complex (Durrani 2004; Yule 2005). As well as the islands at Southwark there is also Thorney Island at Westminster where some traces of Roman activity are known but the nature of Roman occupation here is still very much unclear. Nothing of the Roman period has yet been excavated to modern standards but Roman finds have come from the area and there are reports from the nineteenth century of fairly monumental Roman building remains, including a hypocaust, beneath Westminster Abbey (C. Thomas et al. 2006: 38). It is not impossible that this island had some kind of religious activity here in the Roman period and the site retained its religious significance and was adopted for the abbey but more work would be needed.

Millett (1994) has argued that identifying the rivers and streams of Roman London does not really have much more than limited value in our understanding of the town. Whilst it is the case that there has been a considerable amount of work devoted to identifying river courses in London, the knowledge gained can be used to advance our understanding of the way in which the urban space and urban activities were organised and the space negotiated and experienced. Water formed an integral element of the urban

plan and the cultural attitudes to these water courses, such as the religious activity associated with the Walbrook, will have been a significant element of urban life and the urban biography. But the way in which these rivers were used and altered over time, not only in the Roman period but in later centuries, can also fit into models of changing social attitudes regarding the economy, environment and improvement from Roman to medieval and post-medieval times.

Waterfronts

Another significant group of components in the waterscape at London are the waterfronts and perhaps the best known series of waterfront installations belong to the port of Roman London. These installations have been uncovered mainly from the 1970s onwards but they were also known from an earlier date with discoveries in the nineteenth century (e.g. Price 1870). The high level of preservation of the timber waterfront structures here has allowed a more detailed study of the construction methods and technology involved in altering the waterscape (Figure 2.3; e.g. Brigham 1998; Milne 1985). This preservation also permits a more sophisticated analysis of the social implications of these installations. The first stage in the construction of this port saw embankments and revetments bounding the north side of the Thames and this was followed by the construction of monumental timber wharfs in front of them (Milne 1985). The earliest of these is found at the Regis House site, King William Street, immediately upstream of the bridge location and dated by dendrochronology to AD 63–64. It was monumental in construction with a solid frontage of squared oak beams retained by tie-backs running to a rear wall of timber. These formed a series of boxes which were filled in with dumped material (Brigham et al. 1996) and their construction would have been labour intensive. Adjacent and west of Regis House are the Miles Lane (L. Miller 1982) and Arthur Street (Swift 2008) sites where there was evidence of sections of quay of similar construction possibly built a few years later. At another site, Pudding Lane/Peninsular House, there is evidence of what was probably a landing stage constructed with a front wall comprising of horizontally stacked timber baulks. This structure was not in-filled but remained an open framework which probably supported timber decking (Bateman and Milne 1983: 212–214).

The next main construction phase appears to have taken place in the first half of the second century AD when sections of the waterfront were rebuilt and extended further out into the Thames by at least 15 m. The Regis House and Miles Lane quay was extended to replace the Neronian quay

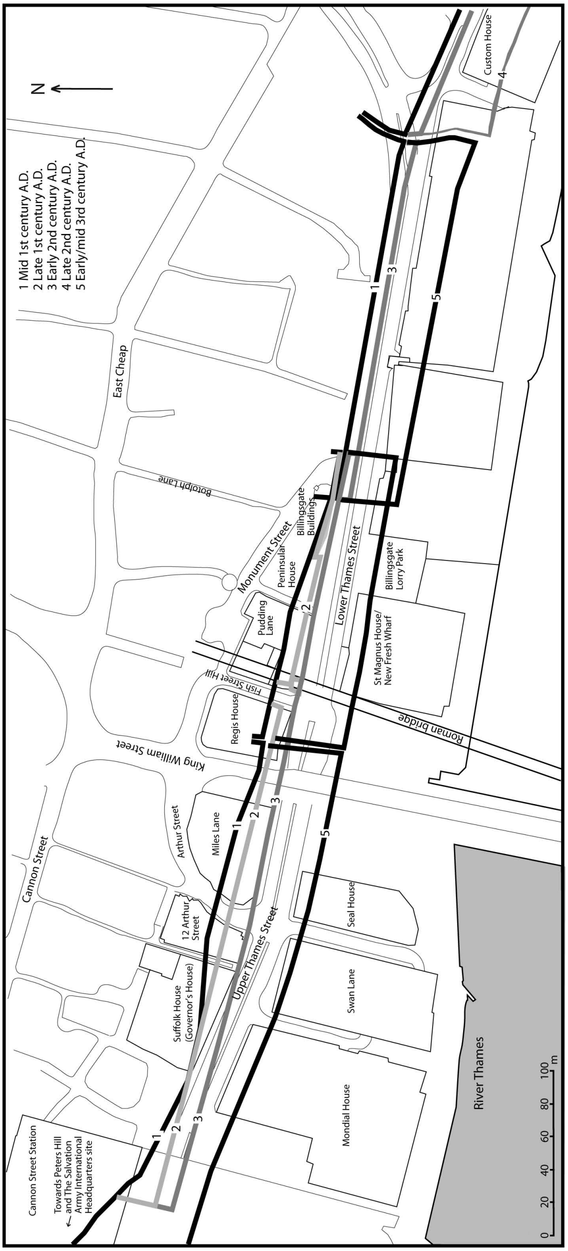

Figure 2.3. Plan of waterfront development on the northern side of the Thames at London from the mid first century AD to the early/mid-third centuries AD (drawn by A.C. Rogers and D. Miles-Williams; adapted from Swift 2008, figure 4)

(Milne 1985: 29) and at the Pudding Lane/Peninsular House site, the timber landing stage was replaced by an in-filled quay constructed of massive timbers laid face to face and stacked one upon the other (Bateman and Milne 1983: 214–215). This appears to have become part of what was a larger-scale extension and reconstruction of the waterfront in the AD 120s, but unfortunately, much of this Hadrianic waterfront now lies below the modern street level and has not been accessible. The monumental nature of these constructions, and those of the earliest phases, along with the relative uniformity of the work might differs from the later waterfront at Suffolk House which was less substantial than the earlier one on the site and included reused timbers (Brigham 2001: 46).

Then again from the AD 140s, the waterfront was extended further into the Thames, and in some cases further along it, as represented by sites upstream of the bridge at Seal House and Swan Lane (Brigham 1990) and downstream of the bridge at the St Magnus House/New Fresh Wharf site (Miller et al. 1986). Now there was less appearance of uniformity and different construction methods were used for various sections. At Swan Lane, six timbers survived of squared baulks 0.20–0.25 m in section laid out to form the quay front; tie-backs were attached to this front and there were also small posts driven into the foreshore in front of the quay (Brigham 1990: 111). The waterfront structures at the St Magnus House/New Fresh Wharf and Custom House sites, however, consisted of revetments of post-and-plank construction against the riverside rather than quays extending out into the water (Brigham 1990: 118; Miller et al. 1986: 8; Tatton-Brown 1974). Around AD 180 an isolated quay was constructed extending further into the Thames at Custom House but apparently not elsewhere (Brigham 1990: 118–119; Tatton-Brown 1974: 112–113). This quay comprised two rows of timber boxes around 1.5 m^2 but they were not in-filled at this time. These constructions may be suggestive of more individual decisions and actions carried out by interested parties using, and possibly owning, sections of the waterfront.

Then in the early to mid-third century it appears that there may have been an attempt to create a more unified waterfront but at some sites north of the bridge, this did not extend much further out into the Thames than the mid-second century constructions (Brigham 1990; de la Bédoyère 1986; Tatton-Brown 1974). The remains on the Custom House site indicate that the quay was rebuilt and unlike the earlier box quay, this was in-filled with deposits of clay and building material indicating a more monumental undertaking (Brigham 1990: 119; Tatton-Brown 1974: 126). There were also now monumental quay constructions at St Magnus House/New Fresh Wharf site represented by five tiers of large oak beams held in position by a framework of

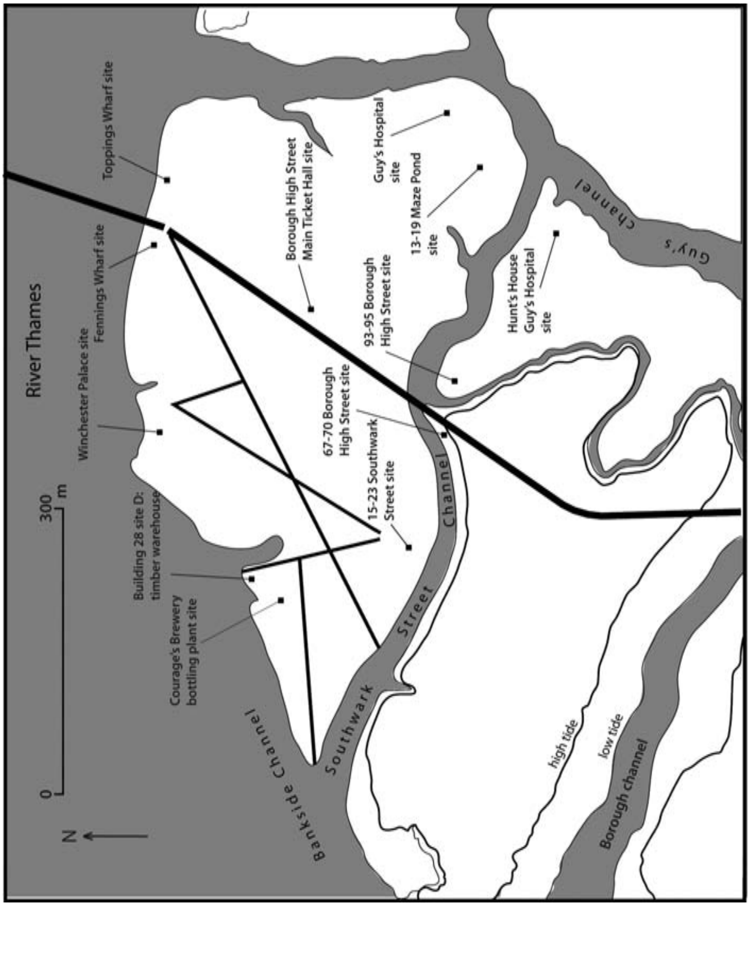

Figure 2.4. Plan of the north Southwark area (drawn by A.C. Rogers and D. Miles-Williams; adapted from Drummond-Murray and Thompson 2002, figure 43)

braces and piles driven into the foreshore (Miller et al. 1986: 8). The attempted uniformity and scale of the building here might be indicative of official involvement once more.

On the opposite side of the Thames at Southwark, the waterfront constructions took on a different scale and appearance again (Figure 2.4). Excavations in northwest Southwark, for example, have revealed a number of small-scale waterfront installations on a series of sites. Excavated waterfronts here dating to the first and early second centuries AD do not appear to have been integrated as a whole and were of a much smaller scale than on the north side of the Thames. On one site there appeared to be a sequence of two waterfronts with the remains of the earlier construction consisting of two unworked round posts of oak 0.14–0.26 m in diameter, and a plank 0.08 m wide not attached to the posts but laid on edge against them. This was then succeeded by a new construction with the remains consisting of four similar timbers, only one of which was worked and had squared sides (Cowan 2003: 16). On another site, remains consisted of a post and plank revetment of vertical posts 0.10–0.12 m in diameter supporting horizontal planks set on edge.

Possible evidence of similar types of waterfronts were found on the northern side of the island at Southwark at the Winchester Palace site (Yule 2005: 15) and the Toppings Wharf site near the point where the Roman bridge crossed the river (Watson et al. 2001: 12). On the eastern side of the island, however, excavations did not locate any conclusive evidence of waterfront installations (Drummond-Murray and Thompson 2002: 13). The land at Southwark is lower-lying than on the north side of the Thames which leaves it at risk of flooding and it is unclear to what extent it was protected by embankments (Brigham 1998: 31; Taylor-Wilson 2002: 14; Yule 1988: 17). Despite the risk of flooding, then, it would appear that there was less in the way of artificial construction on the waterfront here than on the north side of the Thames. The pre-existing geography was retained and despite any practical reasons for this that there might have been it is important to acknowledge the significance of this landscape and the continuing influences that this had on people's behaviour and experiences. Through reconstructions of waterfronts and waterfront use we can address this important aspect of the cultural geography developing social interpretations of the evidence and tie it into our wider understanding of the townscape and urban experience. It is possible to consider what the installations mean in terms of how landscapes were negotiated and treated rather than just addressing the practical and economic uses of the structures.

Often before quays and other artificial waterfront structures were built along riverfronts, rivers were contained within revetments which also formed a significant aspect of the transformation of the waterscape and the biographies of rivers. On the north bank of the Thames at London there is evidence of river terracing, embankments and revetting. The earliest evidence of these alterations of the riverbank comes from the sites of Regis House, Miles Lane and Pudding Lane/Peninsular House. Here there are traces of pits on the foreshore dating to the AD 50s which had been used to extract sands and gravels for building gravel terraces or embankments. These were then strengthened with piles hammered into the foreshore and timber post-and-plank revetments. There were also low wattle revetments and clusters of timber piles which may represent the remains of ancillary structures such as silt traps, jetties or mooring posts which stretched to the south. In some areas, the foreshore appears to have been consolidated to form a hard surface perhaps for grounding flat-bottomed river craft (Brigham 1998: 23).

There is also evidence of revetments along tributaries of the Thames including the Walbrook and the Fleet. Excavations of the site of the Temple of Mithras which lay along the bank of the Walbrook were important not only because of the remains of the mithraeum but because there were traces of revetments constructed along the stream. The excavations here located the course of the Walbrook together with evidence of a series of superimposed revetments each cutting the silted or backfilled channel of its predecessor (Shepherd 1998: 36). The first revetment dated to the second half of the first century AD and the remains consisted of two rows of vertical timbers set in pairs driven into the underlying deposits with horizontal planks set on edge between them and additional planks secured against the outside face (ibid.: 40). There was also a large dump of clay behind the revetment representing consolidation of the ground and the riverbank. The second revetment probably dating to the second century consisted of large timbers at least 1.7 m long and 0.3 m square driven their full length into the surface of the bank. Horizontal planks varying from 0.15–0.38 m wide were fixed to these timbers with nails. A platform connected with this revetment was constructed of heavy wooden planks on a foundation of densely packed vertically driven piles (ibid.: 41). Excavations at the Drapers' Garden site (12 Throgmorton Avenue) also produced well preserved evidence of timber pile and plank structure revetments placed along the streams which were replaced as old structures collapsed (Butler et al. 2009: 18).

Channels around the Southwark eyots, including Guy's Channel and the Southwark Street Channel were also revetted. Excavations on sites that incorporate sections of the channels reveal that there were often multiple

phases of revetments connected with them. Sites along Borough High Street have uncovered traces of revetments relating to the Southwark Street Channel. At 64–70 Borough High Street were two phases of revetment dating to the first and second centuries AD, the first of post-and-wattle and the second of post-and-plank construction. There were also rises in ground level behind them, and their function was probably to consolidate the channel banks and prevent erosion of the eyots (Graham 1988; Yule 1988: 16). Other sites with evidence of post-and-plank revetments are 93–95 (Sheldon 1978: 423) and 97–99 Borough High Street (Bird and Graham 1978: 522). Also along the Southwark Street Channel were the O'Meara Street Car Park excavations in 1994 where there was evidence of timber stakes at a regular spacing, 0.8 m apart, driven into the edge of the channel probably in the later first century AD. There was no evidence of planks, so it was not certain if this was a post-and-plank revetment, but their position parallel to, and at the edge of, the channel suggest that they were part of a revetment (Drummond-Murray and Thompson 2002: 18).

Revetments along the western side of Guy's Channel were found at sites connected with the Guy's Hospital redevelopment in St Thomas Street in 1989 and 1990. It was built of upright timbers and horizontal planks which had been dated by dendrochronology to AD 161. Later timbers parallel to this earlier line dated to AD 241 and may have been a new waterfront or a repair to the existing one (Cowan et al. 2009: 73). To the south of these sites was the site of Hunt's House, along Great Maze Pond, Guy's Hospital, excavated in 1997. Here timber structures were found also relating to the western side of the channel comprising two collapsed sections of post-and-plank revetment (Taylor-Wilson 2002).

Each revetting event will have formed an element of the biography of the river and will have been charged with meaning relating to its construction, who was involved and how it was experienced. In some cases, such as the Walbrook stream in London, it appears that revetments often slumped or collapsed and new channels were cut and revetted: the stream refused to be contained. There was also a period in the third century when the stream appears to have not been revetted. It is possible that this relates to the wider political and economic conditions of the time or it may have proved too difficult or undesirable; this in turn caused erosion of the bank and choked the stream (ibid.: 52). The Walbrook valley was the focus of religious activity in prehistory and the Roman period and it is likely that the Southwark area also had religious symbolism. To alter the riversides through revetments would have had a significant religious and social impact as well as the functional results that it had.

Drainage and Land Reclamation

Drainage activities were also an important aspect relating to the landscape connected with the foundation and development of the town at London. There have been a number of excavations where it has been possible to identify the way in which land was altered and prepared for building on both the north and south side of the Thames. On the north side, the settlement developed on a flat clay-covered river terrace which can become extremely wet. There is evidence of substantial drainage ditches cut into the land such as at Lombard Street where excavations found a ditch around 1.5 m wide and 1.8 m deep which had been dug down into the natural clay (Marsden 1980: 19). Sites along the Walbrook Valley reveal more evidence of drainage, especially from the early second century onwards but beginning in the late first century. In the Upper Walbrook Valley there were a number of drainage channels with post-and-plank revetting (Butler et al. 2009: 18–19; Leary and Butler 2012; Maloney 1990). These channels diverted the courses of existing streams to control the flow of water. Over time they could become deeper and narrower as revetments were replaced and ground levels were raised by dumping material in the area (Butler et al. 2009: 18). The timber box drains from the 6–8 Tokenhouse Yard site indicate the way in which the land was drained and divided up for the construction of timber buildings (Leary and Butler 2012). Throughout the Roman period, however, new drains and ditches were needed as there were periods of flooding; the natural wet conditions of the area always trying to gain the land back.

The amphitheatre was located in the Upper Walbrook Valley and excavations indicate that it was constructed over small tributaries of the Walbrook. It appears that there may have been a deliberate decision to locate the amphitheatre in this watery area and elaborate timber drains were incorporated into the structure (Bateman et al. 2008: 25). The ground was drained by a series of channels aligned east to west before the amphitheatre was built, firstly in timber around AD 75. It could be argued that the amphitheatre needed to be located in a large empty area which was unfortunately wet but it seems likely that there were other areas that could have been used. It is possible that the watery context formed a significant aspect of the building which may well also have been used for religious ceremonies and meetings.

The early topography of the town was dominated by actions relating to the drainage of land and this can be seen more clearly at Southwark across the Thames from the late AD 40s and early AD 50s onwards. The transformation of this low-lying watery area dominated by islands and river channels can to some extent be compared with the changes that took place in the Wigford

area at Lincoln examined later in this chapter. At first the drainage ditches were associated with the early roads which crossed the area. Ditches adjacent to the roads drained water into the channels which separated the Southwark eyots. These roads were constructed on timber corduroy bases to act as a solid foundation on the wet ground and this included the main road which ran through Southwark from the crossing point of the Thames and was excavated at a number of sites including 93–94 Borough High Street, 106–114 Borough High Street and 201–211 Borough High Street (Ferretti and Graham 1978: 53; Schwab 1978: 177; Sheldon 1978: 13).

To the east of this road was a series of drainage ditches which were frequently recut and appear to have been revetted, represented by a line of stakes surviving on the east side of one ditch (Drummond-Murray and Thompson 2002: 18). As settlement expanded to the east of the road away from the central spine of firmer ground which ran through Southwark, and closer to the edge of the eyot, further drainage ditches were dug to make this land stable for buildings (ibid.: 142). At 201–211 Borough High Street, for example, excavations uncovered a series of ditches dating to the AD 50s–60s which were probably intended to drain the surface water and reduce the level of ground water so as to improve surface conditions and building stability (Ferretti and Graham 1978: 79). This site was also associated with the dumping of sand in an attempt to counteract the marshy conditions of the area (ibid.: 63). At 106–114 Borough High Street the earliest activity identified on the site was the construction of a drainage ditch cut into the clay. It was traced over a length of 7.5 m although neither end was uncovered so its length is still unclear (Schwab 1978: 178).

Drainage ditches also formed part of the construction activities in the north-western part of the north eyot at the Winchester Palace (Yule 2005: 84) and Courage's Brewery sites including an early V-shaped ditch found on both sites dating to the second half of the first century (Cowan 2003: 13). The eastern part of the north eyot was vulnerable to flooding and sites excavated in this area have produced traces of drainage ditches dating to around AD 70–100. These sites include 11–19 St Thomas Street excavated in 1977, 21–27 St Thomas Street in 1988 and the Guy's Hospital Redevelopment site (Area 7) which was excavated in 1982 in St Thomas Street (Museum of London Archaeological Archive and Research Centre records 11STS77, STS88 and GHR82). These attempts to alleviate flooding also suggest that there was no riverside revetment at this time which would have helped to prevent water from flowing over onto the low-lying land (Cowan et al. 2009: 18). As river levels fell in the early second century, settlement expanded further to the edge of the eyots but drainage ditches were also needed to make the

low-lying floodplains able to support structures (Figure 2.5). New ditches were cut on the sites of 11–19 and 21–27 St Thomas Street (Museum of London Archaeological Archive and Research Centre records 11STS77 and STS88).

Over time draining activities took place over a wider area of Southwark. On the south side of the southernmost channel, the Borough Channel, at Chaucer House (Tabard Street/Pilgrimage Street), excavated in 1975, for example, parallel lines of drainage ditches were identified cutting into flood deposits (Museum of London Archaeological Archive and Research Centre record CH75). By the mid-second century drainage ditches were dug in the Southwark hinterland and on Bermondsey eyot to the east where much of the land appears to have been used for agriculture rather than building (Cowan et al. 2009: 24). New ditches were dug or renewed in the third century where flooding events continued as have been identified at 21–27 St Thomas Street and on other sites on the outer edges of the eyots (Museum of London Archaeological Archive and Research Centre record STS88; Cowan et al. 2009: 32).

Demolished buildings were also used in land reclamation activities at Southwark as land was consolidated and extended out into the Thames from around AD 80 onwards. Excavations on the Winchester Palace site, on the north edge of the island, have demonstrated that dumps of material were tipped onto the area and the largest component of this material consisted of masonry building rubble including over 650 kg of wall plaster (Yule 2005: 19). The material also included Kentish ragstone, flint, mortar and *opus signinum* as well as domestic waste including pottery, oyster shells and charcoal. The assemblage was fairly homogenous with little evidence of residuality, suggesting that the material was all deposited in a fairly short space of time and that it may have come from one or two demolished masonry buildings (ibid.: 20).

The construction of the earliest buildings along the main Southwark road in the first century AD was typically preceded by dumps of gravel and sand. Many sites were excavated as part of the Jubilee Line extension (Drummond-Murray and Thompson 2002: 37) including the Main Ticket Hall on Borough High Street (Museum of London Archaeological Archive and Research Centre record BGH95) and the British Telecom Junction Box at 61 Borough High Street (BTJ93). A typical sequence of activity was identified at the Main Ticket Hall site with natural gravels over-lain by thick peat in the earliest levels indicating marshy conditions. The ground level was then artificially raised with sand deposits and then clay and timber strip buildings were constructed along the road probably in the AD 60s (Museum of London Archaeological Archive and Research Centre record BGH95).

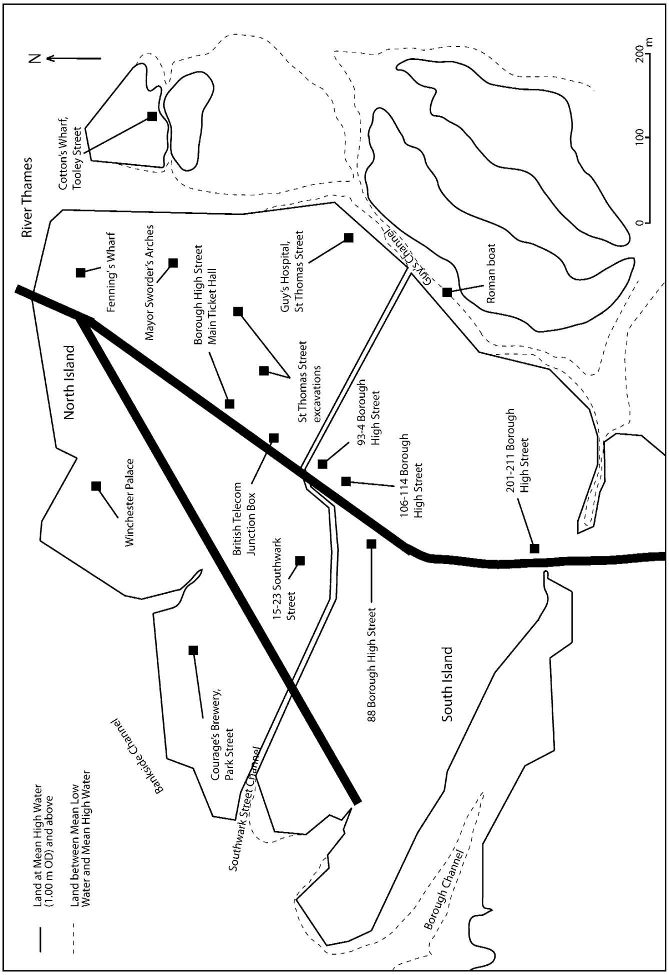

Figure 2.5. Plan showing the extent of land transformation at Southwark by AD 160–200 (drawn by A.C. Rogers; adapted from Cowan et al. 2009, figure 11)

Earlier excavations in Southwark have also produced evidence of gravel and sand dumping across this area including at 88 Borough High Street (Yule 1988: 71), 106–114 Borough High Street (Schwab 1978: 178) and 201–211 Borough High Street (Ferretti and Graham 1978: 63). As settlement expanded eastwards away from the road and onto lower-lying land nearer the edge of the eyots in the second century there was further dumping of material to raise the ground levels prior to building construction. Useful sites here include 20–26 London Bridge Street (Museum of London Archaeological Archive and Research Centre record LBJ95), 15 St Thomas Street (TOM95) and Joiner Street (LBC95). At the site of Mayor Sworder's Arches, Joiner Street, there were extensive mid-third century reclamation dumps on the foreshore further extending the area of level ground into the water and reducing the risk of flooding (Drummond-Murray and Thompson 2002: 143). The reclamation dumps here consisted of material from demolished buildings as well as domestic and other debris including painted wall plaster, roof and flue tiles, pottery and fragments of clay wall; above the deposits on this site there was evidence of a timber building (Museum of London Archaeological Archive and Research Centre record MSA92).

The topography of the north side of the Thames at London was also altered through dumping material. Pollen and insect analysis has indicated that the area around the Upper Walbrook Valley was wet and grassy before drainage ditches were constructed and material was dumped there (Maloney 1990: 26). A series of dumps composed of dark brown silty clay, brown-grey organic clay containing leather off-cuts and light blue-grey clay built up the ground here and these deposits were capped with the laying down of gravelled surfaces (ibid.: 27). Pottery from these dumps indicate an early second century date and this is also the date of the dumps of material at 43 and 44 London Wall and 8 Telegraph Street (ibid.: 56, 60; Museum of London Archaeological Archive and Research Centre records LWA84, LDW84 and TEL83). At the Drapers' Garden site dumped deposits contained a range of material including wall plaster from the interior of buildings and it has been suggested that the material may have been brought into the town from elsewhere indicated a well organised and structured process (Butler et al. 2009: 18–19). Dumping activities continued in the Upper Walbrook Valley into the fourth century with further attempts to raise the level of the ground surface, along with the evidence of new drains, indicate that the wetness remained a problem (Leary and Butler 2012; Maloney 1990: 77). On the 44 London Wall site the road was resurfaced at least four times above separate dumps to raise the land and there were dark organic deposits in the roadside ditch indicating that water continued to accumulate here (ibid.). On the 43 London Wall site the dumps

consisted of grey/dark-grey silty clays containing a light ferruginous content and soft red-brown woody material (ibid.: 72). On this wet ground, many of the buildings identified on these sites were constructed on timber piles but these did not prevent sinkage into the reclaimed land, as the dumped material was compressed (ibid.: 121).

Along the Middle and Lower Walbrook valley similar dumping activities are evident in the first and second centuries AD with large amounts of material being placed by the sides of the Walbrook and the surrounding land which was low-lying and wet (Wilmott 1991). At the Bucklersbury House site, near the later Temple of Mithras, dumps of material were placed by the side of the Walbrook and then timber platforms were constructed in the first and second centuries AD; the temple was constructed here in the third century (Grimes 1968: 93–97; Shepherd 1998). Other sites where dumped material and timber piles have been found include St Swithin's House, excavated 1949–1950, Bank Underground Station, excavated in 1959, and the site of the Bank of England canteen at 1 King's Arms Yard also of 1959 date (Wilmott 1991). East of the Walbrook, dumping took place in the area of the eastern Lorteburn, identified in excavations at Fenchurch Street (Bluer and Brigham 2006). It also occurred along the Thames waterfront where there was boggy and waterlogged ground between the land and the river (Williams 1993: 6). By the late second and early third centuries this reclamation activity allowed the construction of stone buildings rather than timber, unlike in the Upper Walbrook Valley, although even here there was a constant threat from flooding as the numerous phases of rebuilding activity on the mithraeum site indicate (Shepherd 1998). Looking at the relationship between the buildings in the Walbrook Valley and local environment shows a close link between the nature of occupation activity and the waterscape. Timber buildings on piled foundations were perhaps most suited to this environment and there was evidence of industrial and craft activities which were probably also using this water. After sufficient reclamation in the Middle and Lower Walbrook, stone buildings could be constructed but these were also subject to new inundations in the area.

Canterbury

Introduction

The Roman town at Canterbury in Kent began to develop in the AD 40s in the low-lying area of the floodplain of the River Stour and there was probably an important crossing point here in prehistory. The nature of Iron Age

occupation here is still subject to considerable debate largely because of the difficulty of accessing and excavating these layers of activity. Traces of an earthwork dating to around 300 BC have been found but their extent and nature is uncertain (P. Blockley 1987). Coin distributions and structural evidence indicate some kind of settlement here by the end of the first century BC and the concentration of Iron Age coins and structural evidence in the area of the Roman temple precinct which lay in a low-lying area in the floodplain of the Stour has led some to suggest that there may have been an Iron Age shrine here (Frere 1977: 423; Haselgrove 1987: 139–145; Wacher 1995: 194). On the site of the Marlowe Car Park, there is also excavated evidence of part of a triple-ditched enclosure containing roundhouses which were located close to the later temple precinct (K. Blockley et al. 1995: 34–36). Coin distributions indicate that there may have been a shift in occupation from the enclosure to a location nearer to the river in the early-first century AD (Haselgrove 1987: 141). Already, then, it is clear that the topography and waterscape played an important role in the location and nature of the settlement here. Whether the Roman town was located here because of strategic reasons or the importance of the Iron Age settlement has received much debate. Like London, however, it is inappropriate to attempt to separate strategic, economic and symbolic factors. It seems clear that the waterscape here had a crucial cultural role in the meaning of this place and the development of the Roman town will have seen an increased interaction with, and cultural development, of the waterscape.

An Altered Riverscape?

It was often assumed in the past that the present river flowing through the modern city of Canterbury was diverted in Roman times away from the town and it then gradually worked its way back to its original course in post-Roman times when there was not the skill or resources to maintain the diversion (Figure 2.6; cf. Bennett 1984; Wacher 1995). It now seems clear, however, that the river was in fact present flowing through the Roman settlement, and that it was not diverted, and this provides more understanding of the attitudes of the excavators than it does about the Roman period. As the river Great Stour approaches Canterbury from the southwest it splits into two branches at an area that is now known as Bingley's Island: the western branch flows around the outside of what would have been the Roman town whilst the eastern branch flows through it, along Stour Street, effectively cutting the town into a larger eastern and a smaller western half. At the lower end of

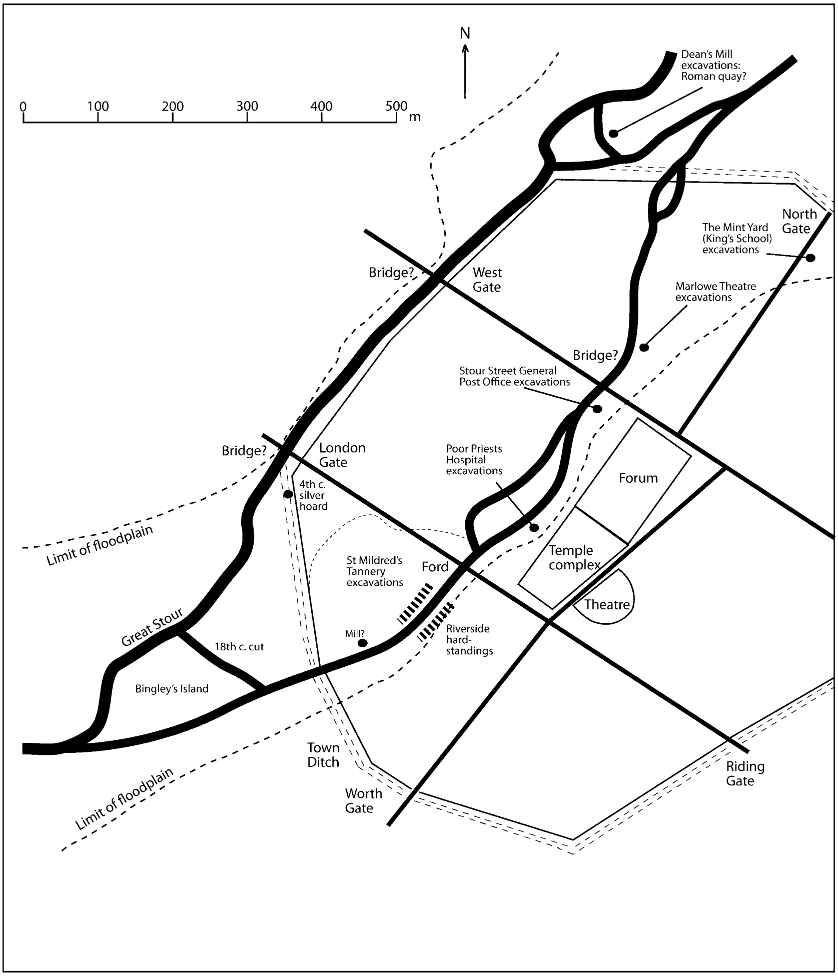

Figure 2.6. Plan of the waterscape at Canterbury (drawn by A.C. Rogers; adapted from unpublished material from Canterbury Archaeological Trust)

Bingley's Island the two branches are now joined together by an artificial cut which was not in existence before the eighteenth century (Goodsall 1953: 116). Bingley's Island and surrounding land were low-lying and used as water meadows in medieval and later times; there is a wildlife reserve there today. The internal branch of the river has an additional extra branch near the centre of the town which created marshy land or an island in between them which was known as 'Binnewith' in medieval times. It was on this island that

a Franciscan settlement was established in the thirteenth century but the nature of this island in the Roman period is still unclear (Goodsall 1953: 123; Lyle 2008: 21).

The low-lying floodplain associated with these two branches of the Stour formed a large part of the topography of the Roman town, and parts of it were enclosed by the town walls when they were constructed in the third century (Frere et al. 1982). This marshy environment that was evident within the town encouraged the idea that the eastern branch of the river must have been diverted away from the Roman settlement (Figure 2.7). Jenkins (1951: 70), for example, in his analysis of the evidence stated: "Why should we expect a river through the Roman town at this point? The ground plan as we know it would be very odd". His observations during construction work on the east bank of the Stour at the rear of the General Post Office on Stour Street within the modern town led him to propose that the origins of the channel were medieval in date because there were apparently no Roman finds uncovered during the work (ibid.). He went on to argue that the branch must have come into existence in post-Roman times through natural causes: "this occurred when the submergence of the land surface, inaugurated perhaps at the end of the Roman period, had reached the point where the water level had risen sufficiently to flood the whole of this area because of its lower lying situation and in the course of time a channel formed through which the stream began to flow through the derelict Roman town".

Excavation work within the city in the 1970s and 1980s, however, demonstrated that this eastern branch of the river was very much in existence at the time of the Roman conquest rather than being a post-Roman formation. Excavations at The Mint Yard of the King's School near the North Gate of the Roman town identified deposits consisting of thick layers of peat and river silt, containing late Iron Age and early Roman pottery suggesting that this was a marshy area connected with the floodplain of the river (Bennett 1980: 15). Deposits of gravel, shingle and loam were laid down to build a road over the marsh in the late first century (ibid.). Excavations at the Poor Priests' Hospital site, which lies along Stour Street and the River Stour as it is presently, also identified early Roman flood deposits (Bennett 1980; 1982) indicating that this area was wet in the Roman period and that the river existed at this time. Bennett's (1984: 15) original argument, however, was that attempts would have been made to divert the river or restrict its floodplain in the first or second centuries AD and that these attempts culminated in the diversion of the branch to outside the town walls when they were constructed. He then went on to suggest that at the end of the Roman period, the river broke through the walls and moved back to an earlier line in the floodplain, perhaps

Figure 2.7. Photograph of the internal branch of the River Great Stour at Canterbury (photograph taken by A.C. Rogers)

to where it is now (ibid.). John Wacher had a similar attitude to the river and its association with the town as Jenkins and others and as late as the second edition of *The Towns of Roman Britain* (1995: 429, nt. 96), he argued that "it seems unlikely" that "the River Stour which now runs through the town centre was present in the Roman period".

Work west of the river at the St Mildred's Tannery site and downstream at the Marlowe Theatre indicates a low-lying wetland environment where timber structures were built in the early Roman period and these were followed by masonry buildings. Archaeological investigation, however, has demonstrated that these areas became increasingly wet and difficult to settle and were mostly abandoned in the third century (J. Holman pers. comm.; Pratt and Sweetinburgh 2004). Excavations of one part of the site fell within the floodplain area of the river and here there were remains of rectangular buildings with attempts made to raise them above the floodwater (Pratt and Sweetinburgh 2004: 12). There was also evidence of flood deposits over Watling Street and in one place they were cut by a ditch that was probably of early medieval date.

Rather than there being attempts to divert the river it is clear that it remained a significant feature of the town throughout the Roman period despite the flooding events. This raises important issues regarding how we perceive Roman townscapes, town planning and practicality. Typical views of Roman towns in Britain as centres of order and convenience probably relate more to early modern attitudes to settlement organisation and planning. The origins of the name Durovernum, as we have seen (Chapter 1), may be suggestive of marshy conditions with the river and its floodplain. This marshland was an integral part of the Roman period settlement as it had also been in pre-Roman times where Iron Age roundhouses, traces of metalworking and a probable Iron Age shrine preceding a Roman temple complex by the side of the Stour are known (K. Blockley et al. 1995: 27–51; Frere 1977; Haselgrove 1987: 139–145).

Waterfront Structures

Timber waterfront structures are known at Canterbury along the branch of the Stour that ran through the town but unfortunately their exact date is uncertain. Here, construction work in the 1930s for the foundations of the new Telephone Exchange in Stour Street which ran along the edge of the River Stour uncovered a large number of balks of oak timber which had been mortised and tenoned together (Mead and Jones 1936: 219). The timbers may have formed part of a quay but the dating evidence was problematic. It may

have been of Roman date because the excavations also produced samian ware of first and second century date and coarse ware dating into the third century, as well as Roman coins and some organic finds including Roman shoe soles (ibid.); alternatively, however, there is a possibility that it was constructed at a later date whilst disturbing Roman material. Further work under modern conditions would be greatly beneficial to our understanding of this river that ran through the town and how its relationship with the land was altered through the construction of waterfronts. At the St Mildred's Tannery site there are traces of a rammed gravel 'hard standing' running down into the water of this branch of the Stour (Pratt 1992). It seems likely that only small boats would have been able to pass along this branch of the river. On the extramural branch of the Stour just outside the town walls at the Dean's Mill site there are also traces of revetments which may have been Roman in date but further work is also needed here (Bennett and Allen 1993). As the following chapters will argue, however, it is important that we do not study this evidence purely in economic terms but it will have had a cultural significance in relation to the way in which the waterscape was experienced as well.

Cirencester

Introduction

At Cirencester there has been much debate relating to the reasons behind the location of the town and there is important ongoing work at nearby sites including the *oppidum* of Bagendon which should be able to help us further. Around 8 km upstream of the area of the town is an earthwork banjo enclosure at Ditches constructed in the first century BC and in the AD 70s–80s a small 'cottage' type villa was constructed within the enclosure suggesting that may have continued to be an elite focus (Trow et al. 2009). The earthworks of the *oppidum* at Bagendon do not appear to have been constructed until around the mid-first century AD and they covered a large area without apparently acting to defend anything specifically. Recent geophysical work over the entire area, however, has identified what appear to be earlier banjo-style enclosures suggesting that there may indeed have been earlier occupation here and the area may then have been aggrandised through the construction of the *oppidum* dykes (T. Moore pers. comm.). This would suggest that there was quite a lot of elite activity in this area and possibly also competition and there were also other farmsteads and settlements in the area including Duntisbourne Grove and Middle Duntisbourne. Recent

excavations at the Kingshill North site located around 2 km to the northeast of the town produced Neolithic pits and Bronze Age activity, including a Beaker burial and ring ditch, but also a farmstead of the late first century BC to first century AD probably being abandoned around the AD 50s–70s with an absence of occupation material of later date (Biddulph and Welsh 2011: 109). Biddulph and Welsh (ibid.) have suggested that the farmstead period occupation may have been absorbed into a perceived ancestry of the land with the late Iron Age inhabitants using the Bronze Age activity, with the barrow still visible, to confer legal and spiritual ownership on the land. This area, then, may well have been imbued with histories and myths which had an impact on activity and occupation.

Around 400 m to the west of the Kingshill North settlement are the Tar Barrows which remain of problematic date but were probably late Iron Age or early Roman (Holbrook 2008: 308; O'Neil and Grinsell 1960: 108). Recent geophysical work in their vicinity has identified an important Roman period cemetery but also what may then have been a significant ritual site from an earlier date (Holbrook 2008: 308–310). What all the evidence suggests is that the vicinity of the Roman town including the Ditches/Bagendon complex and the Kingshill/Tar Barrow area contained a number of elite and other settlements, important for understanding the development of the Roman town, and that the landscape was imbued with meaning perhaps drawing on older activity to legitimise the more recent occupation. This could include the use and manipulation of the watery location of the town.

The town itself was located on what can be described as a thin gravel spine of higher land in between two river channels the River Churn and the Daglingworth Brook. There are traces of what was possibly a small fort, known as the Leaholme Fort, preceding the town which was placed on this spine but the evidence remains far from conclusive. Knowledge of the fort comes mainly from sections of ditches and they appear to have been in-filled in the AD 60s judging from the date pottery found in the ditches (Wacher and McWhirr 1982). Any strategic arguments for the location of the fort and town, perhaps especially in relation to the nearby Bagendon *oppidum*, should also not neglect the possible significance of the immediate location of the fort itself in a watery area and near to the Tar Barrow and Kingshill sites. Reece (2003) has made the important observation that the route of Ermine Street approaching the town deliberately diverts from higher ground to run through the wet valley-bottom. He suggests that this is because the road was avoiding an existing ceremonial site in the Tar Barrow area. This is possible but it is also necessary to acknowledge that in the pre-existing geography the watery location may also have been important. The possible

fort or just the town could have developed on higher ground nearby and still avoided the area of the barrows. This low-lying watery area appears to have been deliberately chosen for settlement. This could be because it provided a convenient water source or that it was avoiding prime agricultural land already under ownership. But there are other implications in placing the town here including the religious significance of the location and the way in which the water could be controlled.

Creating New River Courses

Reconstructions of the pre-Roman topography at Cirencester suggest that fairly substantial alterations were made to the riverscape in association with the Roman town. Our understanding of the Roman and pre-Roman period river systems is made more difficult by alterations carried out in post-Roman times, especially in association with medieval watermills. Excavation and topographical analysis has demonstrated that the town and preceding fort here were located on what was effectively a thin gravel island, or narrow spine within a braided river. The island/spine was probably formed of river-lain gravels of calcareous oolitic limestone which lie at a slightly higher level than the surrounding river and wetlands. As the town replaced the fort and expanded outwards, the settlement moved south and west beyond the island into the lower-lying and wetter ground. In terms of river geography, Cirencester lies at the point at which the River Churn, which runs in a winding valley cutting through the oolitic limestone of the Cotswold hills, meets the broad marshy floodplain of the upper Thames (Holbrook and Wilkinson 1998: 8).

There are two different views concerning the pre-Roman river system but there is more consensus regarding how it was altered in the Roman period (Figure 2.8). To the northwest of the gravel island is the other important element of the riverscape, the Daglingworth Brook whose route differs according to the reconstruction. It either flowed into the Churn at the site of the medieval Barton Mill with the Churn then splitting into two channels with one branch flowing east and then around the east side of the island and the other branch flowing around the western side of the island (Holbrook and Wilkinson 1998: 10). Both branches then came together near the point at which the Roman Silchester Gate was later constructed at the southern end of the town, where Ermine Street approaches it, after the western branch had flowed through the area known as Watermoor. In a simpler reconstruction, it is the Daglingworth Brook which flows around the western side of the island and does not meet the Churn until the Silchester Gate area

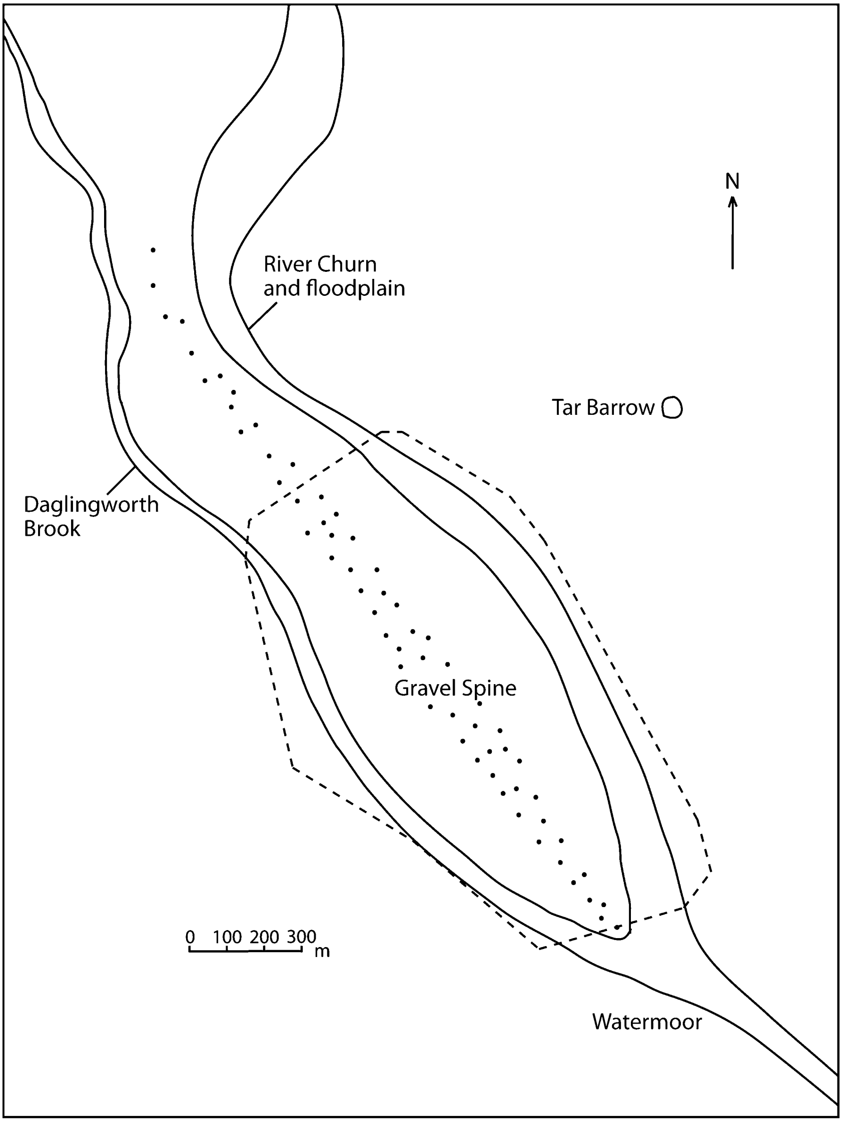

Figure 2.8. Plan of the reconstructed river system at Cirencester prior to the foundation of the Roman town (drawn by A.C. Rogers; adapted from Broxton and Reece 2011, map 1)

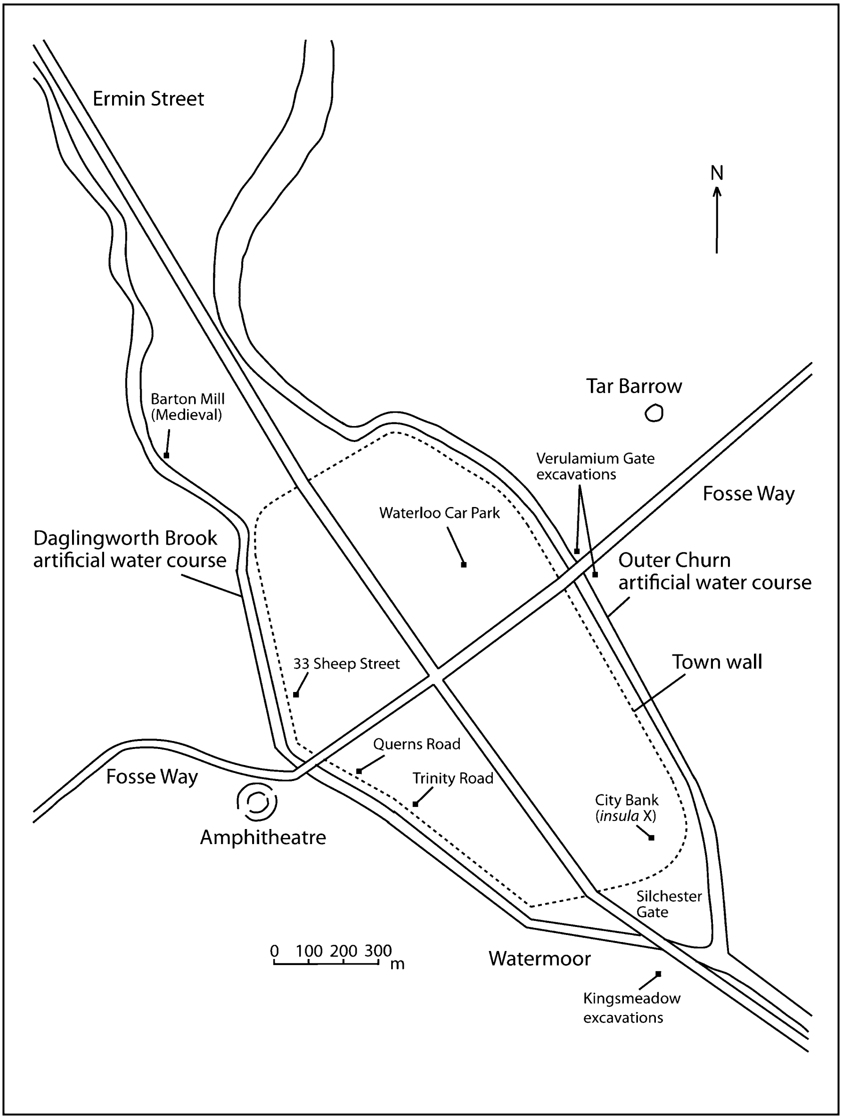

Figure 2.9. Plan of the reconstructed river system at Cirencester in association with the Roman town (drawn by A.C. Rogers; adapted from Broxton and Reece 2011, map 2)

(Broxton and Reece 2011; Reece 2003). Beyond this point is an area known as King's Meadow and where excavations have taken place it has been demonstrated that this was a wet marshland landscape cut by a number of braided stream channels of the Churn (Roberts 1995: 70). As Ermine Street approached from the south it was constructed on a large bank as it crossed this marshland (ibid.), indicating that the wetland area was altered to quite a considerable extent.

It would be difficult to get a more accurate picture of the pre-Roman riverscape here and to some extent the exact details are less important than what we do know: that there were probably water channels on both sides of the spine and their courses appear to have been altered in the Roman period. Excavations on the western side of the Roman town at sites including Sheep Street, Querns Road and Trinity Road at the Cotswold District Council Offices have demonstrated from early layers that the area was low-lying and liable to flooding and the deposits were indicative of the original watercourse flowing here (Hancocks et al. 2008; King 1992). Deposits from ditches consisted of thick layers of silt and clay and molluscan and sedimentological analysis suggests that this area was subject to at least seasonal flooding (King 1990; Langton 1998; Wilkinson 1998).

The excavations have also indicated that the flooding gradually ceased in this area and that the western water course was filled in. What is not so clear is to where it was moved. Broxton and Reece (2011) have argued that it could have been moved outside the line of the town embankments and later walls (Figure 2.9). It is possible that in this case the embankments functioned as some kind of aid to flood prevention as well as defining the settlement. Holbrook and Wilkinson (1998: 10), however, have suggested that the river on this side of the town was removed entirely and redirected to flow into the Churn on the eastern side of the town. This is as yet uncertain but on the eastern side of the town there is clearer evidence that the Churn was taken off its original course in the Roman period and redirected in an artificial channel outside the town. Excavation at City Bank in the south-eastern part of the town (*insula* X) identified what appears to have been the former course of the Churn, within the area of the later Roman town walls, and deposits were associated with first and early second century AD pottery (King 1990). It appears that the course was in-filled around the late first to early second century and it no longer passed through the site. The area, however, remained marshy and liable to flooding and there does not appear to have been much evidence of occupation here in the Roman period (ibid.). Further evidence of this channel and its infilling was excavated at Waterloo Car Park in 1998 (Holbrook 2008: 137).

Figure 2.10. Photograph of the artificial lake within the grounds of St Mary's Abbey in Cirencester which may occupy the original course of the River Churn before it was diverted in the Roman period (photograph by A.C. Rogers)

The projected original course of the Churn incorporates the lake which is in the grounds of St Mary's Abbey and it might be that this indicates that the original course of the river returned after the Roman period and it was then put under further control by the Church in the medieval period. The excessive rains in 2001 caused flooding in the abbey grounds in a pattern that appears to reflect the flow of the original river (Figure 2.10; Broxton and Reece 2011). In the medieval period it was this channel that was probably known as Gunstool Brook and flowed through the abbey grounds and was used to power the Abbey Mill (Gerrard 1994; Slater 1976; Wilkinson and McWhirr 1998: 11).

It is the excavations of the Verulamium Gate of the Roman town in the grounds of St Mary's Abbey that have produced the best evidence of the redirected river and the monumental nature of the work that would have been involved (Figures 2.11 and 2.12; Wacher 1961; 1998). The new channel was cut into solid rock (Forest Marble) which must have been a considerable undertaking. Then a 1.8 m high clay, gravel and stone rubble levée was

Figure 2.11. Photograph of the artificial course of the River Churn flowing outside the line of the Roman town walls within grounds of St Mary's Abbey in Cirencester (photograph taken by A.C. Rogers)

constructed on the downhill side to prevent overflow and flooding of the town probably in the early to mid-second century.

Outside the gateway, the excavations uncovered the abutment of a stone bridge which carried the Fosse Way over the river. Unfortunately, it was not possible to establish a direct relationship between the gateway and the bridge and so it is unknown whether the bridge and gate are contemporary or whether the bridge existed from an earlier date than the walls (Wacher 1998: 39). If they were constructed at the same time then it seems likely that there would have been an earlier timber bridge to cross the river here. Analysis of molluscs from the site has suggested that there was relatively fast-flowing water within the channel (Wacher 1998: 39). Overall, the sequence seems to have been that the earlier course was infilled and the river diverted at the end of the first or beginning of the second century AD and the earthwork embankment constructed at a slightly later date. The town walls were built running inside the line of the river in the third century (Holbrook 1998: 98).

Figure 2.12. Extant remains of the Roman town walls at Cirencester in the grounds of St Mary's Abbey. The artificial course of the River Churn flows behind the walls (photograph by A.C. Rogers)

Land Drainage and Reclamation

It is also possible to see human interaction with wetlands and the monumentalisation of land through drainage activities at Cirencester on a number of sites in the southern part of the town in the modern Watermoor area which was wet in the Roman period. Excavations at Stepstairs Lane in 2002–2003 identified a series of drainage ditches, the earliest of which all contained fills suggesting that they silted up gradually and required re-cutting; they were replaced by new ditches on slightly different locations (Brett and Watts 2008: 73). These ditches dated to the late-first and second centuries AD and there were also consolidation deposits and a masonry structure built on the site. The drainage ditches indicate that the area was quite susceptible to flooding relating to the fact that the site lay at the edge of the gravel spur and in the low-lying area of the river floodplain. As well as indicating the level to which the land was wet at this time, the re-cutting of the drainage ditches is also indicative of the positive reaffirmation of the commitment to this place.

As the town expanded off the thin gravel spine, into the lower-lying floodplain areas, the land had to be built up before it could support buildings. The site at 57 Purley Road indicates that this part of the town remained wet into the third and fourth century with early Roman occupation being sealed by abandonment material and then land reclamation deposits dating to the third and fourth centuries (Holbrook 2008: 137). Excavations at the Cirencester Grammar School, Victoria Road, revealed occupation deposits in *insula* X. The earliest layer on the site was alluvial clay which had accumulated in the early Roman period within the flood plain of the Churn, possibly as a result of land reclamation. The land was then built up with dumps of limestone rubble which were used to create platforms for structures (Grace and Holbrook 2008: 92). At the site of Stepstairs Lane in the southern part of the town there is also evidence of deposits being laid down to raise the ground level in preparation for constructing buildings (Brett and Watts 2008: 70).

Lincoln

Introduction

At Lincoln a fortress preceded the Roman town which lay on the same site and this area is often known as the Upper City, to distinguish it from the settlement that developed outside the area of the earlier fortress, termed the

Lower City. The fortress was located at the point at which the crossing of the River Witham is at its narrowest and it lies at a glacial gap through the Jurassic limestone ridge known as the Lincoln Edge. It was probably founded around the early AD 60s (Jones 1999: 102). The limestone was used for building stone whilst the thick bed of liassic clay beneath it was used to make pottery and bricks in the Roman period. Between the limestone and the clay is a spring line which continued for a long way north and south of the town (Jones and Stocker 2003: 13). The Lower City spread down the hillside towards the River Witham where the liassic clays give way to sandy terraces (ibid.: 18). There have also been suggestions that there may have been an earlier Claudian-date fort established at Lincoln perhaps in the valley floor perhaps at the point at which Ermine Street and the Fosse Way meet. This is the area in which a number of early military tombstones have been found perhaps raising the possibility that there was a cemetery here associated with a fort but unfortunately any positive evidence for the fort itself remains elusive (Jones 2003: 40). It is this low-lying area, however, that seems to have been most important before the foundation of any Roman settlement here with activity focusing on the rivers, lakes and islands here (Jones and Stocker 2003). It might seem reasonable, then, that the importance of this area encourage the foundation of a fort before a fortress was then constructed on firmer and higher ground above the Witham valley. Again the waterscape formed an integral part of this cultural landscape from prehistory into the Roman period.

A Changing Waterscape

The river system at Lincoln is slow-moving and was altered during and after the Roman period (Figure 2.13; M. Jones 1988: 145). The Rivers Witham and Till meet here and form a large natural slow-moving expanse of water known as the Brayford Pool which has gradually been reduced by land reclamation moving its northern edge further away from the Roman Lower City than it would have been in the Roman period. The evidence from molluscs and diatoms from the excavations in the area of the pool support the fact that it was a slow-moving body of water (Jones and Stocker 2003: 16). In its original form in the winter, the water would have expanded to occupy much of the valley floor, shrinking in summer to create a landscape consisting of river channels, meres, pools and islands. Other pools existed as well as the Brayford Pool until more recent times, including Swanpool and Cuckoo Pool, which are much less obvious or no longer present in the townscape today as a result of land change and reclamation (Figure 2.14; ibid.: 17).

Figure 2.13. Photograph of the modern River Witham at Lincoln (photograph taken by A.C. Rogers)

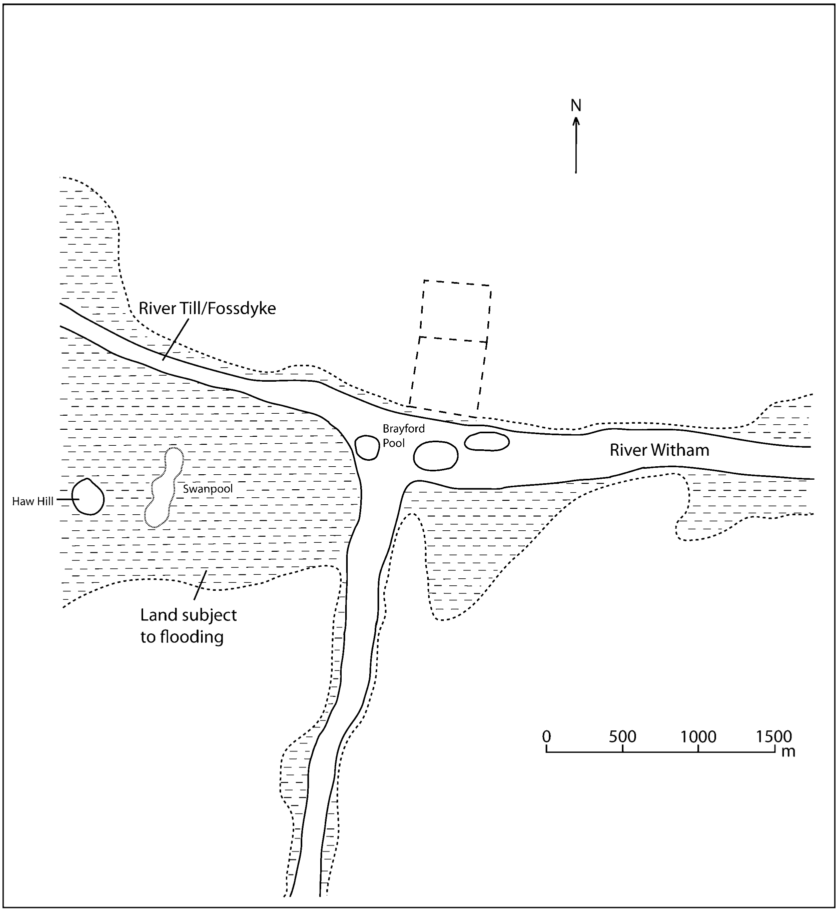

Figure 2.14. Plan of the reconstructed waterscape at Lincoln (drawn by A.C. Rogers; adapted from Stocker ed. 2003, figure 4.4)

Accompanying the pools and rivers were areas of higher land which formed sand islands and these were drier areas where human activity could take place. The northern area of what became known as the Wigford suburb in the medieval period lay in what was previously the Brayford Pool and it is here that excavations at 181–183 High Street and bore-hole analysis from 190 High Street identified traces of sandy dry land which would originally have been surrounded by water. The island was connected to the mainland in the Roman period by the Wigford Causeway, which was the main street running through the suburb in Roman and medieval times. To the east, another island referred to as Thorngate is known from medieval documents, but it has not yet

been identified in the archaeological record, and archaeology has identified traces of another possible island to the southwest (Jones and Stocker 2003: 18).

The evidence of activity on the island excavations at 181–183 High Street included early Roman timber structures of an uncertain function. It has been suggested that the structures may have been military in nature but another possibility is that they had a religious function (M. Jones 2003: 104). Large quantities of sherds of second and third century AD drinking vessels were also found on the site (ibid.: 99), suggesting that there may have been religious activities taking place here. There are also some traces of probable Iron Age activity here and although the exact nature of this is unclear (Steane 2001: 123), it might indicate that the probable religious significance and use of the island continued from the Iron Age into Roman times.

The medieval Wigford suburb, and its Roman precursor, lay to the south of the town across the Witham in a marshy area which was gradually reclaimed and drained from the Roman period onwards (see Chapter 6). The Roman roads Ermine Street and the Fosse Way, approaching the town from the south, converged here and joined the Wigford Causeway which crossed the marsh; all the roads were probably constructed in the second half of the first century AD (Steane 2001: 1; Vince and Steane 2001: 310). In prehistory, however, it appears that the main route of travel may not have been the course of the Wigford Causeway but instead a path through the narrowest point of the Witham Valley which lies about 1 km to the east, in the vicinity of the modern Stamp End lock (M. Jones 2003: 22). It is at Stamp End that many of the famous items of prehistoric metalwork, including the Witham sword and shield, were found in the nineteenth century during construction of the lock (Stocker and Everson 2003). It has been argued that there was originally a causeway here, perhaps originating in the Bronze Age, and that this causeway, along with others in the Witham Valley, remained important as part of the religious landscape into medieval times. In a number of cases, churches were built near known causeways and artefacts of medieval date are also found as votive deposits (ibid.). The low-lying Wigford area of the Roman urban settlement would have been under threat of flooding, especially in the winter, and the Lower City on the hillside would also have had problems with the drainage of surface water due to the springs at the top of the hill (Jones and Stocker 2003: 18). The waterscape was an integral part of the urban settlement here and need not necessarily have been regarded as inconvenient or impractical.

At Lincoln the River Till connects with the Brayford Pool and River Witham and it was canalised at some point to create the Fossdyke. Topographical investigation has shown that this would have been a monumental

undertaking since the original course of the river was shifted and a new canal was constructed. The Fossdyke links the River Witham with the River Trent at Torksey in Lincolnshire. Its easternmost 5 km were formed by canalising the River Till which connects with the Brayford Pool and River Witham at Lincoln (M. Jones 2003: 116). A completely new cut was then made to link this river to another canalised stream which flows into the Trent (ibid.). Unfortunately, there is very little known now about the nature of the original River Till but investigations have found some traces of its original course which indicate that it had moved quite substantially (M. Jones pers. comm.).

Unfortunately, the date at which the canal was created is still uncertain and although the redirection of the Till and the creation of the Fossdyke have traditionally been regarded as being Roman creations, there is as yet no evidence to support this. A Roman period bronze statuette has come from the river at Torksey which has been used as dating evidence but it need not mean that the canalisation took place in Roman times since it was found in the natural riverbed (M. Jones 2003: 116; Whitwell 1970). The Fossdyke is known to have been important in the medieval period when it was part of a large network of inland waterways in the Midlands and it appears to have been re-cut at least once in medieval times and then again in the eighteenth century (May 1988: 51–52; Vince 2003: 235; Whitwell 1992: 58). It has been argued that a similar system of canals operated in the Roman period but there is as yet no good evidence to support this. It might be expected that Roman Lincoln would have received goods such as pottery from the Trent Valley and further north, such as Crambeck ware, if the canal was in existence in the Roman period but Trent Valley wares do not appear in large quantities in Lincoln until the tenth century (M. Jones 2003: 116). This, along with the massive nature of the work needed to move the River Till, suggests that the canal system probably originated in the medieval period, but more work is needed to resolve this problem.

Docks and Waterfronts

At Lincoln some traces of a stone waterfront have been found but the early Roman waterfront now lies well inland as a result of later land reclamation relating to the size of the Brayford Pool and width of the River Witham. What were interpreted as traces of a Roman dock were identified in the 1950s by F.H. Thompson (Thompson 1955; cf. Cleere 1978: 38; Fryer 1973; Whitwell 1970: 43). Thompson's excavation at the junction of St Rumbold's Street and Broadgate outside the south-eastern part of the Roman town uncovered a 6 m

long length of stone wall running east-west just to the east of the lower town walls (Thompson 1955: 131). It was a faced stone wall on a rubble foundation and it is possible that it was used as part of a dock for boats on the River Witham. Thompson noted that to the south and west of the wall there was black silt on clear sand which had probably been deposited by the moving river indicating that the water came up to this location in the Roman period; and current understanding of the course of the River Witham suggests that it would have passed this location before it was narrowed in later times and moved further away from the site of the Roman town (M. Jones 2003: 99). Despite the possible stone quay here, however, it is noticeable that there is still no evidence of any large-scale waterfront installations here and it seems that the waterfront was not altered on a major scale.

The Roman course of the Witham and the location of the Brayford Pool indicates that water would have originally run close by the side of the south wall of the lower town leaving little room for large waterfront installations. Excavations in 1975 on the north side of the Brayford Pool to the west of the medieval High Bridge demonstrated that the Pool had extended most of the way up to the lower town walls. At the Waterside North site excavated in 1987–1991 to the east of the High Bridge there were traces of what may have been a shelving 'beach' here for small boats (Chitwood 1991: 173; M. Jones 1999: 109). Excavations have taken place on the eastern side of the Brayford Pool at a site on the Brayford Wharf East street in the medieval Wigford suburb area (Vince and Steane 2001: 65–68). Discoveries here included the remains of hurdles or stake-built waterfront structures which were later in date to the stone quay on the other side of the river and were probably third century; there were traces of flooding on the site in the earlier Roman period indicating that this area was marshy in the earlier Roman period (ibid.). It is possible that these waterfront structures may have been intended more to hold back the reclamation dumping that took place here as settlement expanded (see Chapter 5), but they could also have been used as waterfront installations for boats. Excavations at St Benedict's Square close to the head of the Brayford Pool, indicated that in the mid-Roman period this area was probably at least partly under water with the molluscan assemblage suggesting quiet, slowly-flowing water conditions (Steane 2001: 166). Here there was evidence of a bank and upright timber posts which may have been connected with activity relating to the water margins, possibly mooring posts for small boats and also to create stability for the waterfront (ibid.). This area was reclaimed through dumping material in the fourth century AD (see Chapter 5) and it appears that there may have been a hard-standing

Figure 2.15. Photograph of the Brayford Pool at Lincoln (photograph by A.C. Rogers)

here. It has also been suggested that the land reclamation activities could have channelled and deepened the river to allow better access for boats (M. Jones 2002: 108). The land then went on to be altered considerably through reclamation, especially from the tenth century onwards (Steane 2001: 166).

Drainage in the Wigford Area

The low-lying area beyond the lower city and around the Brayford Pool at Lincoln (Figure 2.15) was also altered by cutting into the ground and forming drainage channels. These channels were not as elaborate as those at Winchester (see below) and consisted of ditches cut into the ground. Outside the lower town, some early channels are known that may have been used to prevent flooding of the urban area or begin the process of land reclamation of this extramural area (M. Jones 2003: 99).

There have now been a number of excavations on the other side of the Brayford Pool on sites in the area of Roman settlement which in medieval times was known as the Wigford suburb (Figures 2.16 and 2.17). On most

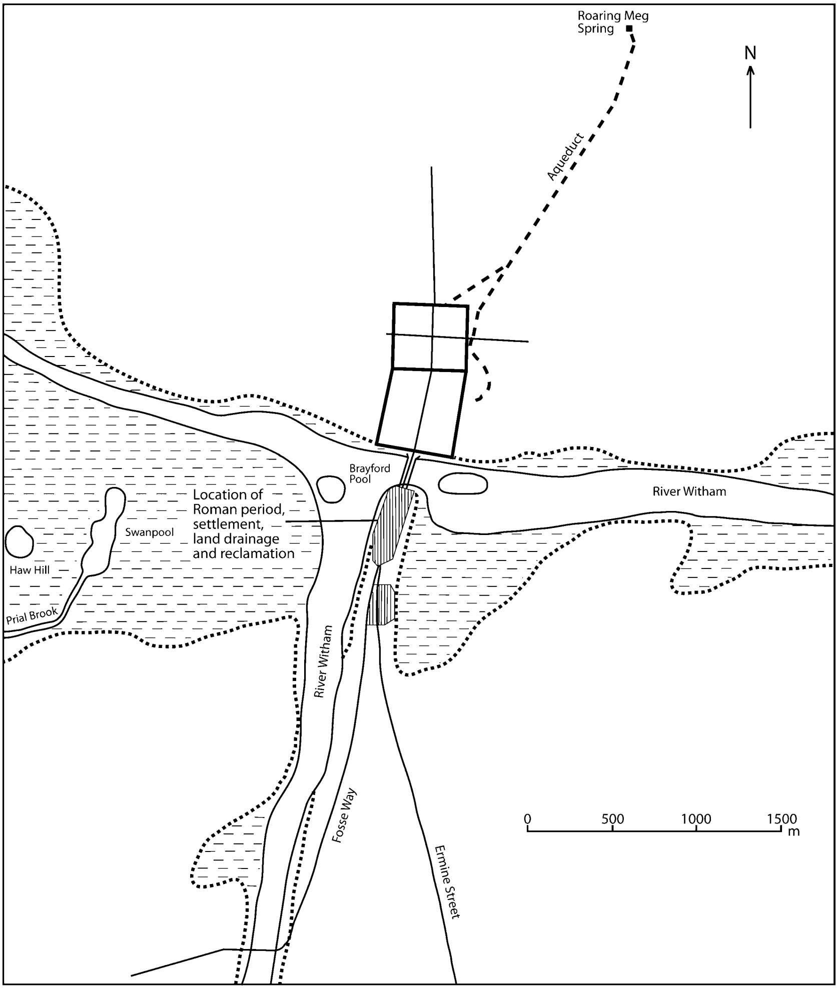

Figure 2.16. Reconstruction of the waterscape at Lincoln with the location of the Roman period suburb (drawn by A.C. Rogers; adapted from Stocker ed. 2003, figure 7.38)

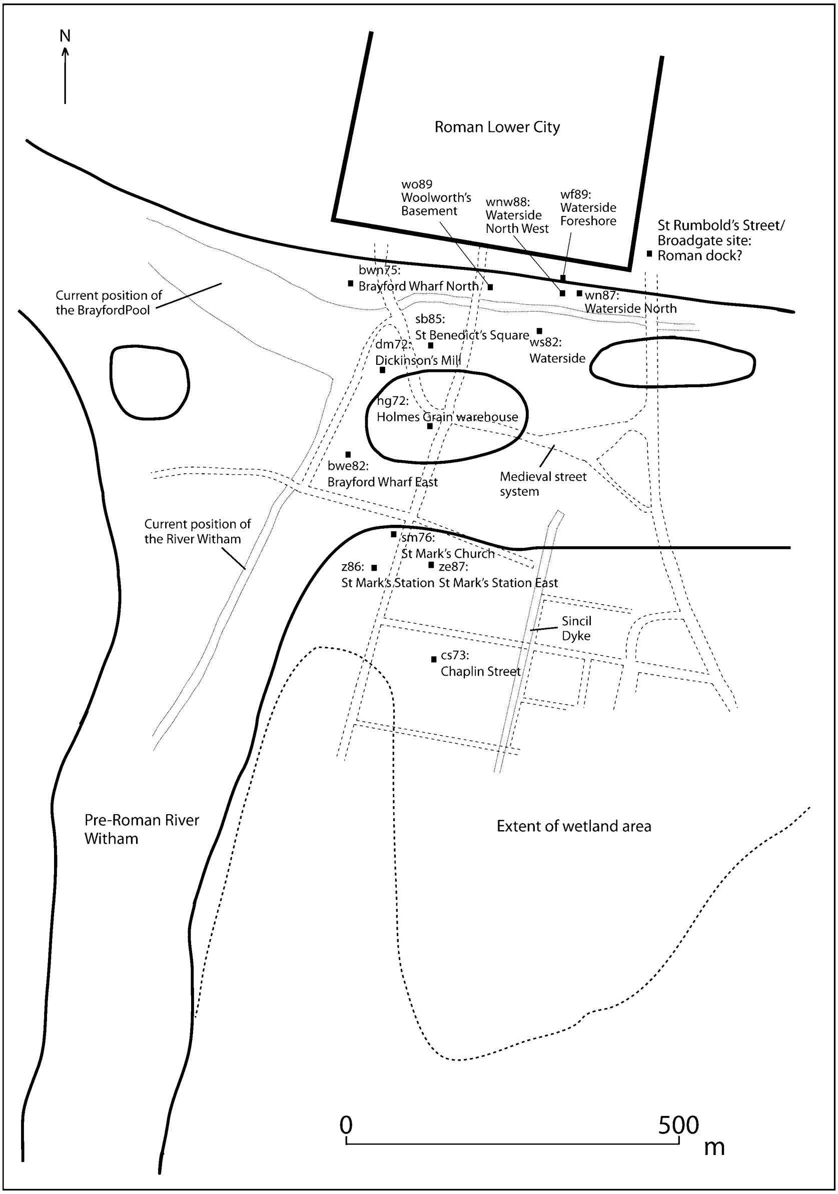

Figure 2.17. Plan of the key excavation sites outside the town at Lincoln in connection with the waterfront, land drainage and reclamation (drawn by A.C. Rogers; adapted from Steane 2001, figure 1.3)

sites excavated in this area there was no evidence of early Roman occupation because the area was too wet—it was a low-lying marshy landscape. The early Roman waterfront on this side of the Brayford Pool has not yet been identified indicating that there has been considerable alteration of the relationship between land and water in this area over time. By the mid-second to mid-third century there is more evidence of settlement here and there are also possible traces of a waterfront. At the site of Brayford Wharf East the waterfront was marked by timber bank consolidation with river silts and peat to its west and at St Benedict's Square there were timber posts which were surrounded by river silt which may have been set into the river bottom close to the foreshore (Vince and Steane 2001: 311).

To the west of Ermine Street one important excavation has taken place on the site of the closed St Mark's Railway Station. On this site, river silting was observed dating up to mid-second century levels but then a substantial drainage channel was identified that had been dug into the land (Steane 2001: 206). This was in use up to the late second or early third century AD, before being backfilled in the mid-third century. This drainage channel appears to have been one of a number of such channels in this area. Following the drainage activities there were landfill operations to build up the ground and then stone-founded 'strip' buildings were constructed gable-ended on to Ermine Street with what appears to have been a 'hard-standing' behind them leading down to the water (ibid.). It appears that these buildings were demolished at the end of the fourth century and further dumping activities took place to keep the water from encroaching onto the area.

Also to the west of Ermine Street were the 1976 excavations at the site of St Mark's church which was demolished in 1972 (ibid.: 268). Like the St Mark's Station site, the earliest phases on this site were marked by riverine silts indicating waterlogging and inundations. There was then evidence that by the mid- to late second century a series of parallel north-south ditches and gullies were constructed close to the road which appear to include roadside drainage ditches forming part of a wider effort to drain this area. By the mid-third century the flooding was under control and three or four adjacent timber aisled buildings were constructed on the site which appear to have remained in use to the end of the fourth century and possibly beyond.

On the east side of Ermine Street a site excavated in 1973 at Chaplin Street uncovered another series of drainage ditches dug in the late second century AD as occupation in this area intensified (ibid.: 16). It appears that this may have been marginal land in the early and latest Roman periods

with no evidence of occupation but in the mid Roman period there is evidence of boundary markers, drainage ditches and gullies. From the mid-second century settlement was expanding into this marshy area. Also east of Ermine Street was the 1987 site of St Mark's Station East which demonstrated that by the early to mid-third century the marshy conditions here had been made suitable for the construction of timber strip-buildings (ibid.: 303).

These sites in the medieval Wigford area indicate that the wetland formed a significant component of this urban landscape. They were increasingly drained, managed and put to use as part of the settlement. The exact scale and extent of the land transformation in the Roman period is unfortunately uncertain because the available areas for excavation have been small and there was an increased level of drainage in medieval and later times. The construction of the road through this wetland towards the town required drainage ditches and gullies which suggest official planning. Apart from this, however, it is difficult to say whether there was an organised effort to drain the area or whether it took place at a more local level by land owners and developers who went on to construct shops and other buildings here. If it did take place at this localised level then it implies that there was an increasing acceptance that this wetland—which formed an important focus in pre-Roman times—could be controlled, transformed and used for settlement. In the medieval period there were further increasing levels of deposition of material to consolidate the land (Vince and Steane 2001: 317).

Land continued to be reclaimed into the later Roman period at Lincoln around the Brayford Pool and the area of what was later the medieval Wigford suburb. These actions gradually reduced the size of the Brayford Pool and reclaimed the surrounding marshland, a process which continued in medieval and later times. Excavations at Waterside North, which is situated between the Roman walls of the Lower City and the River Witham revealed that the dumping of material to claim land and reduce the width of the river began in the second and third centuries AD followed by larger-scale dumping in the fourth century. The material used for the dumping activities included a considerable quantity of organic material that survived because of the wet conditions including leather shoes and other leather and wooden objects, as well as a large number of cattle bones (Chitwood 1991; Dobney et al. 1995; M. Jones 2002: 108). Excavations at the nearby site of Brayford Wharf North, also on the north side of the Brayford Pool, provided further evidence of material dumped to create a stable waterfront area between the town walls and the river (M. Jones 2003: 99). Beyond the Brayford Pool in the medieval

Wigford suburb area, there was considerable land reclamation in the third century with dumps of landfill consisting of gravel and other material to make the land stable for building (Steane 2001: 206, 268). Excavated sites include St Benedict's Square, where there were fourth century dump deposits, St Mark's Station with landfill dating to the mid-third century and St Mark's church where dumping preceded the construction of timber buildings (ibid.: 166–268).

Winchester

Introduction

In the immediate vicinity of Winchester there is evidence of early Iron Age settlements, apparently unenclosed, with traces of roundhouses found on sites including Staple Gardens, Jewry Street, Tower Street and the Discovery Centre/Northgate House site in the northeast area of the later town (Ford et al. 2011; Qualmann 2004). It is usually suggested that the Winchester area possessed natural geographical advantages for settlement with its crossing point of the River Itchen and favourable land (e.g. Ford et al. 2011: 173). Then in the late Iron Age, between 300 and 100 BC, a monumental bank and ditch enclosure containing an area of around 20 ha known as the Oram's Arbour was constructed and it is usually argued that its location was strategic at an intersection at a number of routeways and the Itchen crossing point controlling communications and trade (ibid.: 176; Qualmann et al. 2004: 90–91). It is often described as an *oppidum* although the nature of sites placed in this category all differ in a number of ways. Excavations within the enclosure have identified a number of roundhouses although knowledge of the exact nature of the internal occupation remains partial (Ford et al. 2011: 178). There may also have been Iron Age activity outside the *oppidum* enclosure nearer the floodplain where there were a number of small islands of higher ground (e.g. Cunliffe 1964). The Oram's Arbour lay on the western side of the valley of the River Itchen and partly underlay the Roman town (Qualmann et al. 2004: 86–87) and it is clear that the river and its floodplain were already important components of the site here both in terms of its location at a crossing point and the way in which the water will have had an impact on the experience of living or visiting here. The beginnings of the town's street-grid were laid out around the early AD 50s (Scobie 1995a). There is as yet no evidence of a military phase to the settlement although some suggestions have been made based on the character of some early ditches identified (cf. Zant 1993: 50). There is likely to have been a complex process of negotiation

amongst local peoples, and possible Roman officials, as the town developed but the location and process must also be considered in terms of the cultural meanings associated with this watery landscape and the role it played in urban development and land manipulation.

Topography and Change at Winchester

Topographical analysis of the area around Winchester has demonstrated that there was at least one, and probably more, islands within the channel of the River Itchen at the point at which the Roman town was founded. The islands were formed in prehistory by vertical springs percolating up through the gravels of the riverbed and forming solid areas of chalk tufa within the river, some of which still survive today downstream of Winchester. The earliest buildings of the Roman town, including the *forum-basilica* complex and a small temple were found on the tufa island (Zant 1993). The reasons behind this are unclear but it may relate to the pre-existing meaning and use of the island.

An important model for river diversion in the Roman period comes from this town where fieldwork indicates that before the Roman conquest there was a wide floodplain belonging to the River Itchen containing one or more islands within it and a number of river channels around them (Figure 2.18; Qualmann et al. 2004; Zant 1993). Winchester is located at a point where the floodplain of the River Itchen is constricted by two projecting spurs: St Paul's Hill to the west and St Giles' Hill to the east (Scobie 1995a: 4). The size of the main island within the river remains uncertain but excavations at various points around it have suggesed that it may have been around 6.4 ha in area and rose about 1.5 m above the floodplain (ibid.). At present the main branch of the Itchen flows around the outside of the eastern course of the Roman and medieval town walls but some excavations, though unfortunately fairly limited in areas, suggest that this was not its original course and instead it originally flowed where the town expanded to the east of the tufa island; another channel would have flowed around the west side of the island (Qualmann 1993; Scobie 1995b; Scobie et al. 1991). No trace of a fort has yet been found here (Scobie 1995b), suggesting that it was a deliberate decision to found the urban settlement in this wetland setting.

Topographic analysis suggests that the main branch of the Itchen was an artificial channel sitting unnaturally on the edge of the river valley (Figure 2.19). This situation has been supported by some excavation work along the line of the Roman and medieval town walls. Excavations have taken

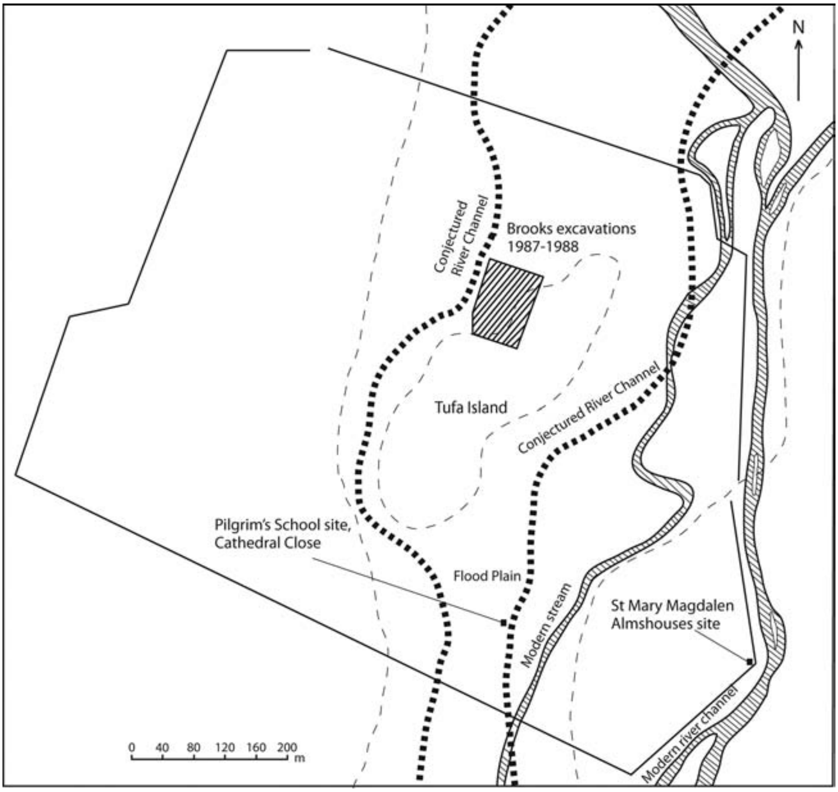

Figure 2.18. Plan of the reconstructed riverscape at Winchester (drawn by A.C. Rogers; adapted from Zant 1993, figure 4)

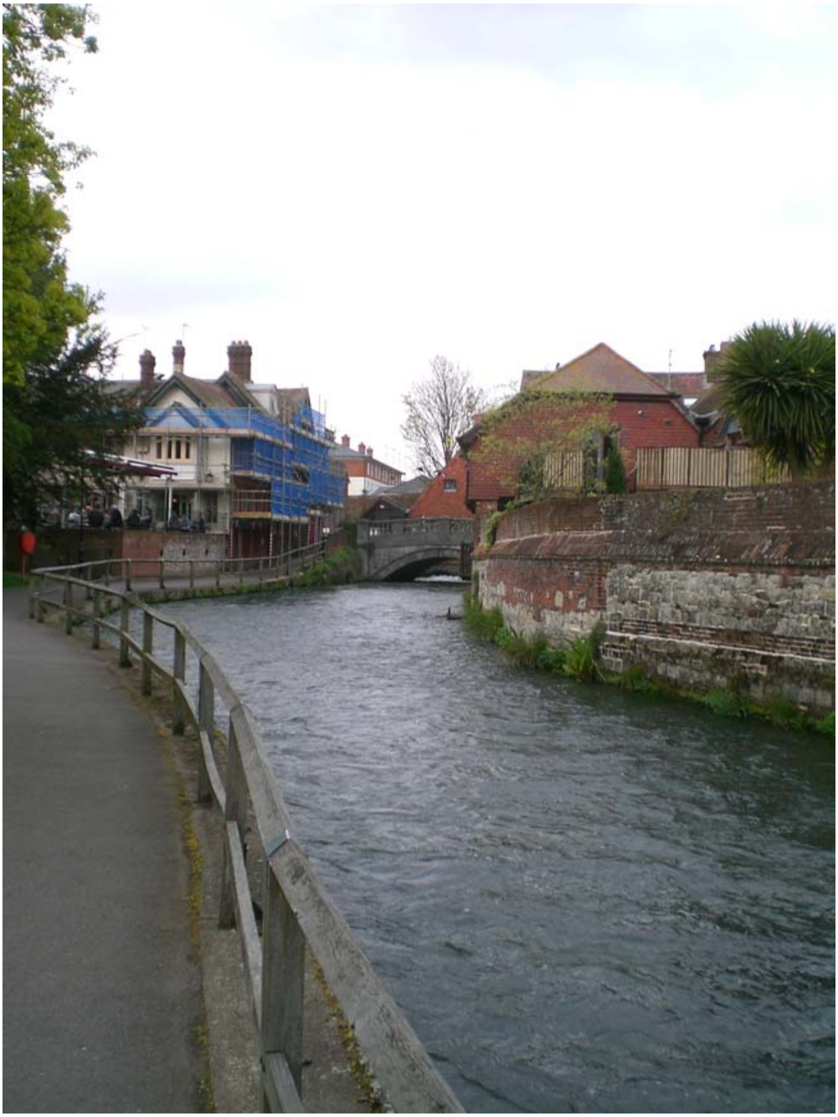

Figure 2.19. Photograph of the current River Itchen at Winchester (photograph taken by A.C. Rogers)

place on the site of the St Mary Magdalen Almshouses which lay along the line of the town walls and adjacent to the river. The site was only small but there was evidence to suggest that the river had been moved from elsewhere. The earliest layers, pre-Roman in date, suggested that there was no real slope leading down to the river that might be expected adjacent to a river valley and the sub-soil consisted of decayed chalk unlike the gravels or alluvial silts found on the low lying areas of the floodplain (Qualmann 1981). The river channel here had the appearance of an artificial introduction and therefore did not have a river valley or floodplain. Excavations here also identified that there was no early line of defences on this side of the settlement, dated elsewhere in the town to around AD 70; they did not appear until the end of the second century with an earthern rampart and then stone wall in the third century (ibid.).

The date of the redirection of the river if it did occur, however, is uncertain. It may have been connected with the construction of the defences along the eastern side of the town in the late second century at the same time as the settlement began to spread off the tufa island and into the floodplain (Scobie 1995b). This formed part of a major drainage programme of the floodplain which has been identified at the Brooks site and which allowed the town to expand (see chapter 5; Zant 1993), but no good dating evidence has yet been found. The site of the Pilgrims' School, Cathedral Close, occupied an area of the Itchen floodplain as it was before the Roman conquest. Bore-hole analysis on the site prior to construction work appeared to indicate that the area became progressively drier into the second century with the possibility of allowing settlement to expand into the area, suggesting that the river channel had been diverted away from this area by this time (Champness and Teague 2008; Champness et al. 2012). There is also the added problem that there is still no evidence for the method in which the river was moved, but it must have been a monumental task excavating a new channel for the river whether slaves, the army or other arrangements of labour were used. There is also a possibility that the current channel of the river is in fact largely in its original position but was perhaps subjected to greater levels of control in the Roman or post-Roman periods but the Pilgrims' School site does now support the idea that it was diverted at this time (Champness et al. 2012). In post-Roman times it appears that the controlled river system may have broken down to some extent although the eastern branch, if it had indeed been moved there in the Roman period, remained outside the walls.

There has been much archaeological and historical work documenting the unusual system of river courses in the medieval city where by around AD 900 water was directed to run along a series of channels where Upper,

Middle and Lower Brook streets are (Biddle 1976; Keene 1985; Scobie 1995c; 1996). Water was also redirected to serve watermills within the settlement, many of which lay within the properties of the religious houses and along the main channel of the Itchen (Biddle 1976; Keene 1985). Without good dating evidence there remains a possibility that the main Itchen channel was diverted around the walls at this time rather than the Roman period. Rippon's extensive work (2000a; 2008) on land reclamation in rural contexts has demonstrated that major changes to the land with drainage projects were initiated between around AD 700–900. As it stands the evidence available does appear to support a Roman date for any river diversion that took place here but it is important not to assume that these major engineering projects must have been undertaken in the Roman period since major landscape events also took place at later times.

The Winchester Drainage Channels

Excavations at the Brooks site revealed good evidence of the way in which this land was transformed on a relatively monumental scale (Figure 2.20). The western part of the town was situated on the chalk and gravel terraces of the side of the Itchen valley and overlay the eastern half of the Iron Age Oram's Arbour enclosure, whilst the eastern half of the town was lower-lying in the floodplain of the Itchen. This section also included the tufa island which provided an area of higher and firmer ground where the earliest structures were built including the public buildings. Between 1987–1988, excavations took place in the Brooks area which lies north of the High Street in the north-eastern part of the historic city. The eastern part of the excavation site overlay an area of the known tufa island whilst the western part ran into what was the lower-lying river floodplain and it is here that there is good evidence of land drainage activities.

The most important find was a monumental timber-lined drainage channel found on the south side of the Roman street. There were two main phases associated with it and it is worth describing in some detail (Figure 2.21; Zant 1993: 25–26). In its first phase the ditch had a flat-bottomed, V-shaped profile and measured around 2 m wide. The base of the ditch was lined with oak planks to create a timber channel 1 m wide and 0.55 m deep, draining west to east. The high level of organic preservation meant that some detailed information could be gained regarding construction methods of the drainage channel and it also indicates that the channel must have lain well below the level of the water table in the Roman period. The base of the channel was formed by three timber planks lying side-by-side and the sides were lined

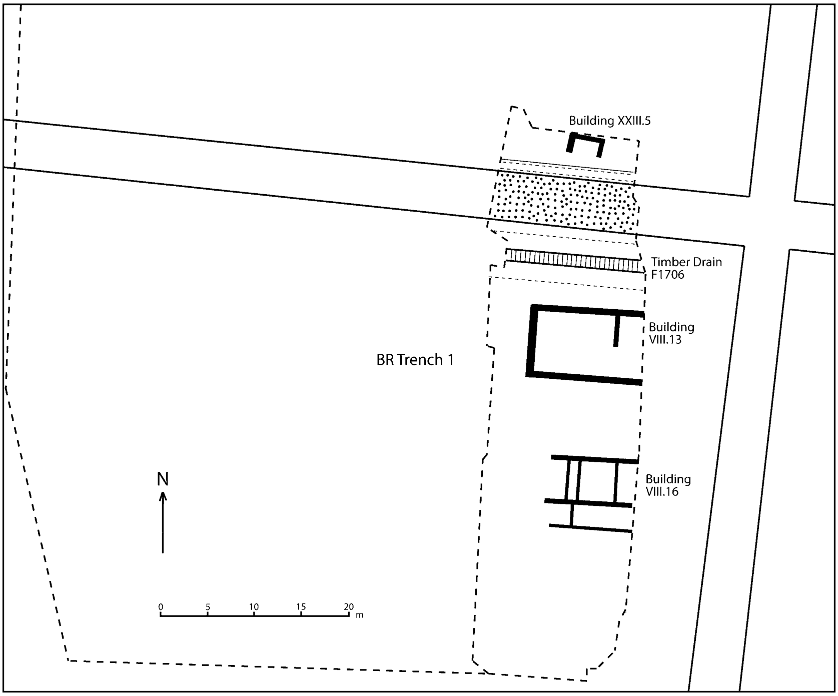

Figure 2.20. Plan of features from the Brooks site excavations at Winchester dating to the mid-second century AD (drawn by A.C. Rogers; adapted from Zant 1993, figure 35)

with two courses of planking, with each plank measuring around 0.05 m thick and between 0.35–0.50 m wide. There was one complete and undamaged plank surviving which measured 2.90 m long. The timbers were held in position along the sides of the channel by a series of upright timbers set at about 1.3 m intervals and these were driven through holes in the floor timbers and into the subsoil. Investigation of the ditch itself indicates that the bottom of the ditch cut had been stepped so that the timber drain could be inserted. Unfortunately, attempts to date the channel by dendrochronology were unsuccessful but pottery associated with the channel suggested that it was in use by the late first century AD, draining the low-lying western part of the site.

The channel gradually silted up which meant that it required re-cutting and re-lining during the first half of the second century. The ditch was re-cut to around 3 m wide, but the construction methods remained fairly similar to the preceding period (ibid.: 29). The timbers of the channel were less

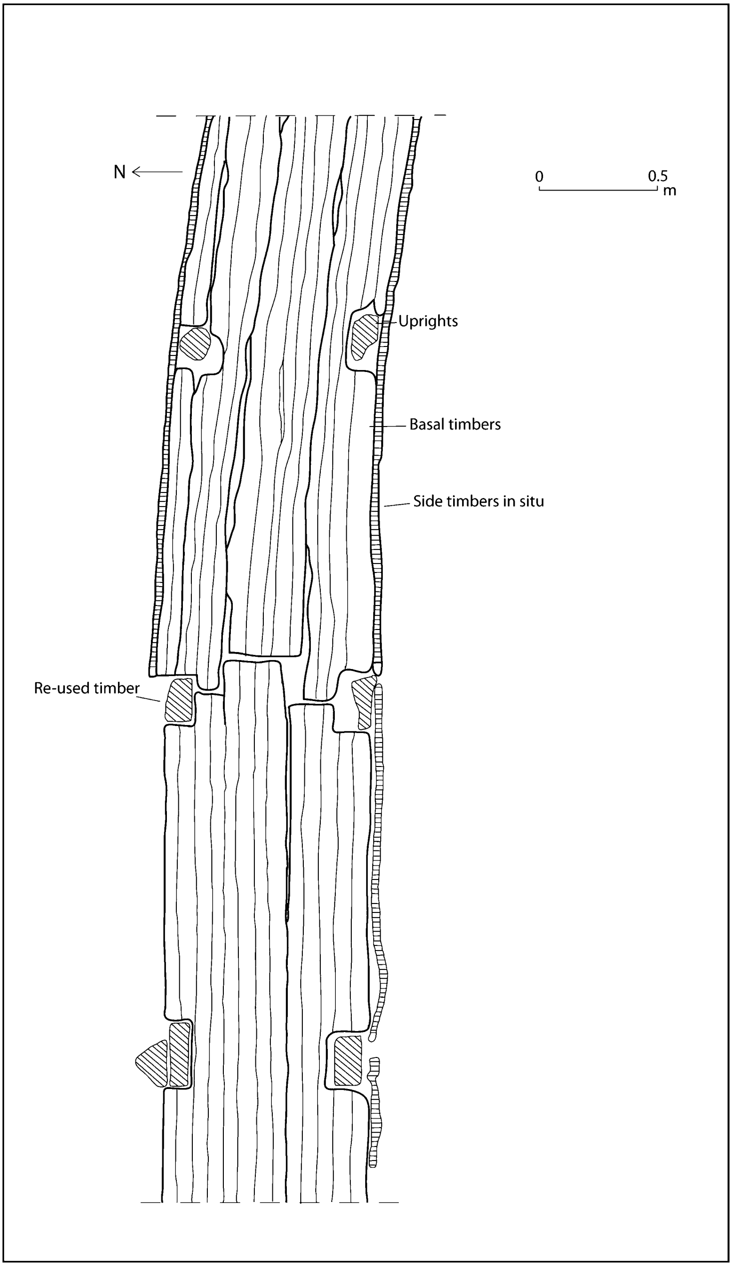

Figure 2.21. Plan of the remains of the timber drain from Winchester (drawn by A.C. Rogers; adapted from Zant 1993, figure 25)

well-preserved for this phase but the channel now appears to have been thinner with the base only being two timbers thick rather than three. Only a single course of planking survived along the sides of the channel, and most of this had collapsed onto the channel base. The channel remained in use until the later second century when the land then became sufficiently drained for building to take place in this area (ibid.). It is unfortunate that the excavated area was not larger because this monumental drain was clearly part of a larger drainage operation. It was a monumental structure and clearly a major statement of intent and had a significant impact on the nature of the immediate environment.

At Winchester, too, as the town expanded from the tufa island and into the floodplain, not only was the land drained with channels and ditches but there were also large dumps of material to consolidate the land for building (Zant 1993). Through excavation and bore-hole analysis it has been possible to reconstruct developments in the topography of the settlement. Excavations in the Pilgrims' School site, Cathedral Precinct, encountered natural deposits in the earliest layers which were overlain with organic silts and sands suggestive of a flooded landscape or landscape of shallow slow-moving or stagnant water. Sealing this were layers of flint and chalk material, possibly demolition rubble, that contained fragments of tiles and painted wall plaster along with iron nails and fittings, parts of leather shoes and several coins of the later third century AD (Champness and Teague 2008; Champness et al. 2012; Teague 2006). This deposit indicates the deliberate dumping of material beginning in the second century AD, possibly including material derived from demolished buildings, in an attempt to reclaim this area of land in the valley bottom and create a usuable surface. A thick accumulation of organic silts dating to the later Roman period, however, implies that the damp conditions returned to this site even after activities were undertaken to reclaim the area and that the task may have proved too challenging (Champness et al. 2012; Teague 2006). The drainage and reclamation activities may well not have been completed by the late fourth century, or remained inadequate, when the town's drainage system as a whole began to break down and the local environment reverted to wetter conditions. The results of the Pilgrims' School project did not produce any clear evidence of what was constructed on the reclaimed land and it might be because this was at the edge of town near the town walls where there was not a pressure for land. This area may even have been an open area used for keeping animals, horticulture or other activities (Champness et al. 2012: 53). This would imply that an attempt was made to reclaim the whole area of the town even if it was not all built on or ultimately successful in some parts.

Conclusions

It is clear from these examples that placing importance on the waterscapes and cultural significance of the components of these waterscapes that we can gain a much more sophisticated and nuanced understanding of Roman urbanism, urban development and the urban experience. It also helps us in our understanding of the relationship between town location and development and pre-existing activity and place. Although pre-existing activities and meanings attached to places need not necessarily be an influencing factor in the siting of towns this does not mean that they will not have influenced their cultural development.

The next three chapters will examine the elements of the waterscapes in more detail and discuss, through these case studies and evidence from other towns, ways in which they have been studied in the past and how through new theoretical frameworks we can read these waterscapes and their implications for urban studies in alternative ways.

CHAPTER THREE

RIVERS, LAKES AND ISLANDS: TOWNS, CHANGING WATERSCAPES AND GEOGRAPHY

Introduction

Rivers are a highly dynamic presence in the landscape; they are in a constant state of movement and change and they alter the land through which they flow. Consequently, in many cases, the relationship between rivers and the settlements on their banks will have changed over time. This process of change not only relates to the river channels themselves but also other, often interconnected, elements of the waterscapes including lakes, pools and islands. Changes will also have been influenced by human actions where either the rivers, lakes and other forms of water were deliberately altered themselves or they changed indirectly as a result of other human activities in the landscape. Before the human relationship with waterscapes in the context of Romano-British towns can be considered, it is necessary to examine more details about the locations elements of waterscapes that were found at each of these places at the time of urban development. Analysing past waterscapes, however, especially how river courses have changed naturally over time, can be a difficult task and it is worth recognising that despite these changes there will often also have been a longer-term stability and constancy in the presence of water which will have continued to have an impact on human action and experience.

As seen in Chapter 2, in a number of Roman towns there were also smaller rivers and streams that were significant elements of townscapes, and the urban experience, but which no longer exist in any visible form in the current settlements, at least on the street surface. These streams and rivers could form a significant part of the urban environment and can be studied archaeologically like other urban features. The waterscape relating to each urban settlement will have been unique forming a significant aspect of the appearance and experience of each town. Drawing on the earlier case studies and wider discussion, this chapter will examine the presence of rivers, and connected elements of waterscapes, as components of inhabited spaces. In reconstructing past waterscapes, however, it is important to move beyond purely descriptive approaches and address the implications of this

knowledge in terms of social significance and experience of these urban topographies. As archaeological features, it is necessary to acknowledge the theoretical nature of how these river courses are analysed and interpreted and develop a more nuanced way of thinking about how they were used and experienced in the landscape. The scientific and economic approach of geography and geoarchaeology is important for assessing past riverscapes but it is also necessary to address the social context of where rivers flowed and the nature of water use, control and manipulation in rivers.

The River

Rivers can be studied in terms of their geography but also in terms of their symbolism, metaphorical associations and religious associations. Indeed in studying rivers, Herendeen (1986) has argued that "history, myth, geography, cosmology, science and magic are all but indistinguishable". Rivers were dynamic features in landscapes of human activity and so they should form part of studies of history (Tempelhoff 2009: 79). The British landscape is characterised by a large number of rivers, as a result of high levels of precipitation and underlying impermeable rocks, and these are what make the landscape different from many other parts of the world. But British rivers, due to the size of the island, are also small compared with some of the world's major rivers; the two largest, the Severn and Thames, being only 354 km and 336 km long respectively (compared with the Nile at around 6,648 km, the Amazon at 6,275 km and the Yangze at 5,519 km; Park 2005b: 7; Wohl 2011). Rivers, however, can contribute significantly to the special character of places and this can be at a highly localised level.

The river is much more than a single entity because its character can alter considerably along its course as it changes itself and flows through different environments. Landscape diversity can have a major impact on the nature of rivers (Soulsby et al. 2009). Whilst rivers usually have a well-defined bank separating channel from floodplain or valley side (Ferguson 1981: 99), conceptually they should not be considered in isolation from the meadows, fields, woods, settlements and people on their banks. Modern scientific study has endeavoured to examine rivers from their source to the sea but investigations of rivers can always prove challenging. The first systematic river gauging in Britain—measuring water surface elevation ('stage') and volumetric discharge (flow)—, for example, was not carried out until 1912 (Ward 1981: 1). No river, however, can conform solely to geographical categorisations and scientific study—which can divorce its flow from time

and space—and each river is unique depending on the way in which it evolved in its location, differences in climate along its course and the way it has changed over time (cf. Park 2005b: 12). These differences not only between rivers but between different river sections will have created various cultural responses to them and brought individual characteristics to the settlements through which they flowed. Across the world different terms are used to describe various water speeds and appearances reminding us of the importance of local cultural values connected with rivers and close contact with them through daily life. Whereas in the Amazon, for example, whitewater is the brown sediment-laden water of rivers, in North America whitewater is often used to describe the flow of water over rapids; in the Amazon there is also blackwater and bluewater indicating different perceptions of water (Wohl 2011: 12).

Rivers can also be politically contentious with river water and river space contested and negotiated between different people with varying viewpoints and desires (cf. Bender 1998 and 2001 for the archaeology of contested landscapes). Strang (2001), for example, has examined the way in which the Mitchell River in northern Queensland in Australia today is negotiated by a number of different interested parties including the Aboriginal community of Kowanyama, European Australian pastoralists, miners, commercial fishing industries, environmentalists and National Park rangers and tourists. Each group has different viewpoints, experiences and concerns relating to the river which emphasises the complex possibilities for understanding waterscapes in the past and the different perspectives to how rivers were treated. Altering waterscapes, then, can be considered in terms of conflict as well as the structural and economic aspects of these actions. This case study reminds us that there are likely to have been an equally complex range of perspectives in the past.

In basic geographical terms, however, the river is usually divided into three sections: Upper, Middle and Lower (Park 2005b: 12). The Upper Section is where the river has its source and it often consists of more than one stream flowing downhill in an upland environment. As the headwater streams merge they form a river which, as it comes to its middle section, flows across a floodplain and runs in a channel composed of alluvial (river-based) materials which had been deposited by the river under flood conditions in the past. Now that the river runs through alluvium, rather than the solid rock of the uplands, it has a much greater ability to shape its own course—and it is this that creates the huge variations in rivers that we have. The river channel pattern is one of the most common ways of describing a particular river. It is rare to get straight sections of rivers, unless there

is an underlying constraint such as resistant bedrock. Rivers meander naturally which means that they tend to move across the landscape over time which can alter their relationship with settlements. This dynamism of rivers can also be dangerous through the erosion of river banks (Folkard 2005: 81). A meandering river erodes the outsides of bends and deposits point bars at the insides (Ferguson 1981: 106). There are also rivers that actively change channels but the erosional and depositional activity is not concentrated at bends and point bars are uncommon (ibid.). The actively meandering and braided rivers rework substantial parts of their valley floors but there are also rivers today that are not perceptibly migrating and so their channel patterns are not changing. This situation probably relates to the power of the water in relation to bank erodibility, although human action, especially post-medieval industrialisation and urbanisation, will also have affected river change (Ferguson 1981: 117–121; Soulsby et al. 2009).

In its lower section, the river is wider, deeper and flows faster with a relatively high sediment load which can alter its colour and create further dangers. It flows across a wide and relatively flat floodplain on its way to the sea and although it can appear to be flowing slowly or sluggishly it is in fact moving faster than in its upper reaches (Park 2005b: 26). When it reaches the sea it broadens out considerably into an estuary and the fresh water from the river mixes with the salty water of the sea. This salt water and its context in the estuary and sea were dangerous compared with the fresh water in rivers (cf. Bruun 1992: 75). When the tide is out the water flow is downstream whilst when the tide is in, it flows in the opposite direction. Many of these features relating to rivers could be also culturally and symbolically significant and will have had an impact on the way in which the rivers were experienced through the human senses—especially relating to the shape of rivers, the speed of flow and the periods of flood.

Individual sections of rivers in the British landscape will have been associated with cultural meanings relating to the nature of the water in that area and the place through which it flowed. The notion that there can be an archaeology of the 'natural' environment has tended to concentrate mainly on geoarchaeology and the reconstruction of palaeoenvironments (e.g. A. Brown 1997). Bradley (2000), however, has examined the cultural use of 'natural' places in the past reminding us that people's actions did not take place divorced from the surroundings. To some extent we can also consider elements of the physical environment as archaeological artefacts themselves because they were used and interpreted by human action. Edgeworth (2008) has argued that the notion of a river as 'natural' as opposed to a 'cultural

entity' is misguided because rivers are always interpreted from the human perspective; the notion of 'nature' itself is an artificial human construct by bracketing 'culture' off from it in ways that we cannot necessarily apply to the past (cf. Insoll 2007). Rivers, and other elements of the waterscapes, can be regarded as much as objects of archaeological investigation as any building or object. As with other objects and features of the landscape, the meanings attached to rivers could contribute towards cultural identities and senses of place (cf. Pooley 2005: 137). In understanding rivers, then, it is important to combine the scientific knowledge gained from geography with their local cultural meanings not only of rivers as a whole but also individual sections and places. In Roman Britain this could include the views of local peoples but also the range of different peoples that may have entered Britain after the conquest.

In Britain there are also thousands of standing waters ranging from small ponds and pools to large lakes (Bailey-Watts et al. 2000: 180). Lakes are water-filled hollows in the earth's surface, inland from the ocean but although they might appear well-defined entities, they do not end at their shores and they cannot be isolated from the land around them; they are integral parts of the whole landscape (Burgis and Morris 1987: 1–3). The hollow in which water collects to form a lake, the lowest area of the catchment, is the lake basin—the sides and bottom of the lake itself. The region from which water drains and arrives in the lake basin is the catchment area or drainage basin and the water may drain straight into the lake or first into a collecting system of streams and rivers and even through other lakes. It is the extent of the catchment and the amount of rainfall that determine the volume of water entering a lake whilst the regional geology—whether there are hard (little erosion) or soft (readily eroded) rocks—can influence the nature of the water within the lake (Bailey-Watts et al. 2000; Burgis and Morris 1987: 5). The difference between a lake and a pond is not clear-cut but in Britain they are usually distinguished from lakes by their size and are defined as small water bodies between 1 m^2 and 2 ha in area which hold water for four months of the year or more (Bailey-Watts et al. 2000: 185). Hartley's work as a local and cultural historian (1964: 121–125) documented the large number of varied artificial ponds that could have been encountered in post-Roman Britain and it can perhaps serve as a reminder of the variety that may also have existed in Roman times. She documented, for example, lime ponds where the pelts of slaughtered animals were placed, pit ponds from disused mine workings, and peat ponds. It seems likely that water would have been encountered on a much more regular basis than it is today with modern urban living.

Lakes and ponds can be productive and provide resources in terms of plants and animals depending on the nutrients within the water and the environmental conditions (Burgis and Morris 1987: 24–43). They are fully integrated elements of the landscape and so changing landscapes by building on land, controlling rivers and reclaiming land can have an impact on them by affecting the flow of water into them, their temperature, mixing patterns and nutrients (Bailey-Watts et al. 2000: 198). The cultural and religious meanings that could be associated with individual lakes can be seen, for example, in their use as foci for religious deposition (Moret 2001; see the account by Strabo IV.1.13 of the lakes at Toulouse).

Dynamic Riverscapes

Many of the rivers associated with urban spaces today, and also those flowing at the sites of deserted Roman towns, have changed in form and course from how they were in pre-Roman and Roman times. Understanding the way in which river courses have changed over time in relation to town locations is important for considering not only the way in which rivers may have been used for transport and trading activities in the urban context but also the way in which in which rivers formed an element of urban spaces. This is often especially in connection with the size of the rivers where there is a reduction in width and magnitude of flow from earlier times. The changing circumstances and nature of rivers often forms an important aspect of the study of geomorphology which examines landforms and the processes that shape and alter them. Geoarchaeology is an important specialism which combines geomorphological and archaeological data to look at how landscapes have changed over time (Allen 1997; A. Brown 1997; French 2003; Needham and Macklin eds. 1992). Studies can include the examination of how river systems, including their channels, flow and floodplains, have altered as well as the equally complex subject of how coasts can change. These topics also form an important element of studies within Physical Geography which documents changes to rivers and the reasons for these changes (e.g. Gregory ed. 1977; Marsh et al. 2000; Soulsby et al. 2009). Within these studies, however, there has generally been less attention paid to the social impact of these waterscape changes on those inhabiting the landscape; addressing these implications has mainly been the preserve of social historians (e.g. Mauch and Zeller eds. 2008b). Physical Geography is often highly technical, and necessarily so, in order to deal with the complexities of the raw data but the scientific emphasis does not mean that other theoretical approaches to

interpreting the material cannot be addressed. We can also explore the social implications of rivers and river change through their relationship with their settlement context.

One way in which rivers can change over time is in the size and strength of their flow (Marsh et al. 2000). Artificial influence on these changes can range from large-scale disturbance through the construction of a major water supply or flood retention reservoir or through longer-term and more gradual developments through land use change and land drainage (ibid.: 111). The River Lavant at Chichester in West Sussex, for example, still flows today in the modern city but is now reduced mainly to what is known as a winterbourne. Higher extraction rates by the water authority and the increase in surface water drainage has lowered the water table and increased the run-off rate so that now the Lavant does not usually flow for the whole year (Down 1988: 43). Due to this size decrease it has been estimated that in the Roman period the river probably flowed for the whole year unless there was a very dry summer. The Roman town of Verulamium in Hertfordshire is located on a chalk plateau on the south-eastern fringe of the Chiltern dip slope which is cut by a number of river valleys including the River Ver which has a confluence with the Colne 8 km to the north (Niblett 2001: 29). Today the Ver is small and slow moving and so could be neglected as being a significant feature of the Roman town. The condition of the river today, however, is mainly due to water extraction in more recent times. This means that in the Roman period the river would have been faster and more powerful. Identifying these changes is important because the river's appearance, flow, speed, depth and width will all have formed significant characteristics of the town and the experience of the urban space.

River courses can also change over time which can have an impact on our understanding of the relationship between towns and rivers in the Roman period. An archaeological survey and landscape project at the Roman town, and its environs, at Caistor-by-Norwich in Norfolk, for example, has shown that whilst the River Tas was probably not much wider in Roman times than it is today, its course through the land has changed (W. Bowden pers. comm.). The site of the Roman town did not become an urban settlement in post-Roman times and the area is today used mainly for agriculture which means that a greater level of study of the landscape has been possible. A variety of survey techniques have been used to identify old courses of the river including plotting the levels of buried river deposits. The results have indicated that the course of the river has moved westwards over time away from the town. In the Roman period, the river would have run closer to the town, forming a more prominent aspect of the urban topography than it might appear

today.[1] There is also increasing evidence that the site was important in the late Iron Age with excavations within the town producing Iron Age coins and pottery and a number of circular and sub-circular structures identified by geophysical survey underlying the Roman street-grid which are suggestive of Iron Age settlement focusing on the river here (Bowden and Bescoby 2008: 332). Whilst Wacher (1975: 230) described the choice of site for the town here as "completely arbitrary", it seems that this was already a significant place and one where the river was an integral element of the site.

The river at the Roman town at Gloucester would also have been a more prominent feature than it is today, although here the modern city and environs make analysis more complicated (Figure 3.1). It is known that over time the River Severn has moved away from the site of the Roman town but there remains uncertainty as to the exact details in the way in which the route has changed (cf. Fullbrook-Leggatt 1964; 1968; Heighway and Bryant 1999; Hurst 1974; 1986; 1999). As well as the site of the *colonia* and proceeding fortress at Gloucester itself there was another fortress of earlier date at Kingsholm roughly 700 m to the north. Whilst the fortress at Gloucester was probably founded in the AD 60s, the Kingsholm fortress may date from the end of the AD 40s (Hurst 1988; Wacher 1995: 150). Differing from the current river course, archaeological evidence suggests that this area where the Kingsholm fortress and *colonia* at Gloucester to the south were sited lay at the

[1] There has also been some debate regarding the nature of the wider river network in which Caistor-by-Norwich was situated in the Roman period. It has been argued that the River Tas formed part of a network of rivers connected to a large open tidal estuary on the east coast termed the Great Estuary which has now largely been lost due to land-claim. Rivers within this system include the Bure, the Yare (with the Tas as a tributary) and the Waveney which all drained eastwards to the estuary. It is usually supposed that the estuary's mouth was roughly where Great Yarmouth is today, with the tidal estuary of Breydon Water being the only surviving remnant (Gurney 2002: 12). It has been argued that the Great Estuary would have been a major trade and transport route with settlements, such as the Roman small town at Brampton in Norfolk, taking advantage of it to grow and prosper (J. Davies 2009: 207; Gurney 2002). Acceptance of the Great Estuary model, however, is not universal and there has been some debate regarding the extent to which the river system has changed. Peterson (2009), for example, has drawn attention to possible Roman period archaeological evidence on the land near to where Great Yarmouth is now. He has suggested that the bar of land on which Great Yarmouth is situated need not have been under water in the Roman period and may have been the site of a long-established natural causeway that was already linking the land of the Broads in this area. This would clearly have implications for our understanding of the extent to which the river was used at Caistor-by-Norwich for transportation but the river would also have had other uses and meanings associated with it which were not so influenced by the nature of the Estuary.

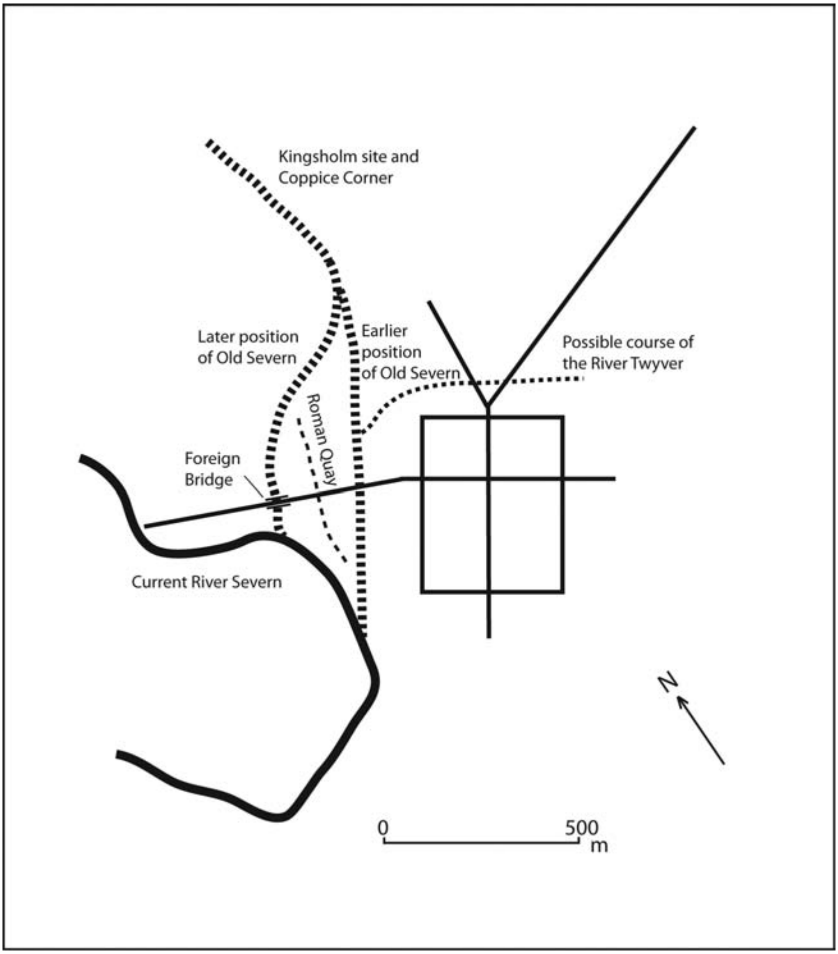

Figure 3.1. Plan of the reconstructed river system at Gloucester in association with the Roman town (drawn by A.C. Rogers; adapted from Hurst 1988, figure 3.1)

point at which the River Severn originally broke into three branches before coming together again immediately downstream beyond the town (Hurst 1986: 1–3). These three branches will have been a dominant feature in the landscape and there were also a number of streams that drained water into the Severn from the Cotswold edge 4 km to the southeast of Gloucester; these included the Sudbrook which flowed around 500 m to the south of the *colonia* and the Twyver just to the north. The Twyver flowed through the expanded medieval town and its course was consequently altered many times so that

it is now very difficult to know exactly where it flowed in the Roman period (Fullbrook-Leggatt 1964). Excavated evidence relating to the natural contours, however, have suggested that its course may have run close to the north side of the walls of the Roman fortress and later town (Fullbrook-Leggatt 1964; Heighway and Bryant 1999: 3).

At present there are two branches of the Severn at Gloucester flowing to the west of the site of the Roman town; the easternmost of these two branches flows under Westgate Bridge which is a construction of medieval origin (Fullbrook-Leggatt 1968: 9). The space between these two branches was known as Alney Island in medieval times and would have been low-lying and probably swampy. Immediately downstream where the Severn reverts to one channel again, there was another island which was known as Naight Island before the eighteenth century when it was then lost by canal construction (ibid.). From current knowledge of the area it seems likely that it existed in the Roman period.

Another significant difference in the waterscape in the Roman period to that of today is the third most easterly branch of the Severn which in the Roman period flowed close to the town. This branch is often referred to as the Little or Old Severn in the archaeological literature (e.g. Hurst 1974: 46). The exact course of this branch remains difficult to reconstruct but archaeological excavation across a number of sites suggests that by a combination of natural and artificial processes of land reclamation from Roman times onwards the river gradually moved westwards away from the walled area. It eventually became nothing more than an underground watercourse represented by a culvert. Whilst it was a prominent feature in the landscape, there will have been an island of some kind between it and the next river branch, perhaps not unlike Alney Island which lay to the west. The course of the Old Severn branch can also be identified from the medieval period bridge known as Foreign Bridge that crossed it; from here the road led towards Westgate Bridge. The bridge was originally built in the twelfth century with seven arches but by the seventeenth century only four of these were in use as a result of the river narrowing; by the nineteenth century the bridge was completely obsolete as the river had disappeared (Hurst 1985: 3). Traces of known waterfronts also indicate that the eastern bank of the river moved at least 80 m west between the Roman period and the twelfth century when the Foreign Bridge was constructed; these waterfronts will be discussed further in the next chapter.

Like the Severn at Gloucester, the exact course of the Soar in relation to the Roman town at Leicester is still not totally clear and the canalisation of the river in the nineteenth century means that it has been altered considerably

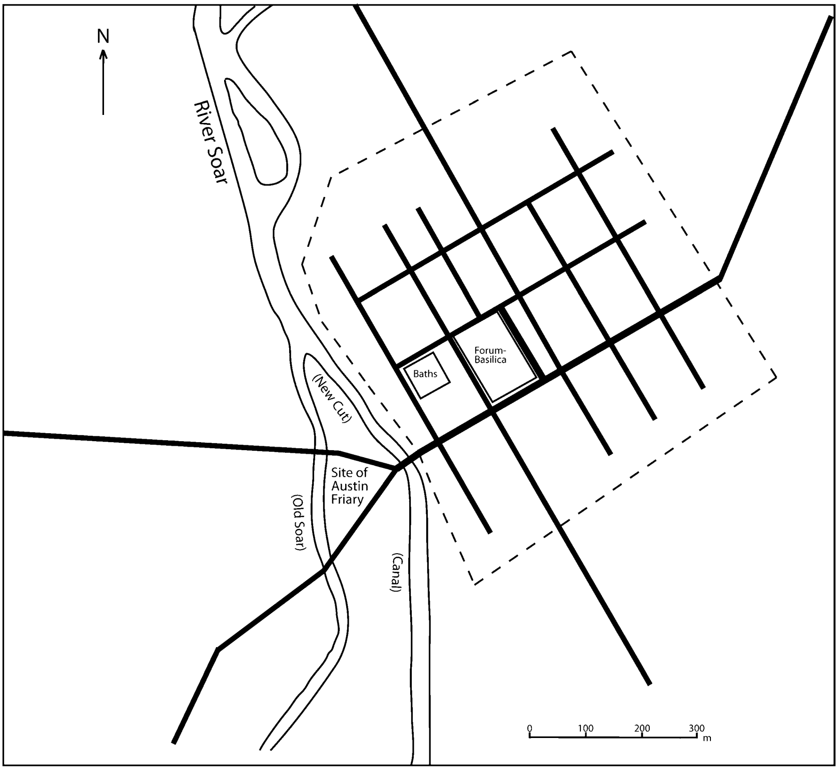

Figure 3.2. Plan of the modern riverscape in association with the reconstructed Roman town location at Leicester. It is noteworthy, as with some other town plans, that the street grid appears to be deliberately orientated towards the river (drawn by A.C. Rogers; adapted from Cooper and Buckley 2003, figure 4.1)

since the Roman period (Figure 3.2). Leicester lies at the point at which the Soar today divides into two branches with the eastern branch running past the site of the Roman town—referred to in later times as the New Cut—and the western branch, the Old Soare (Mellor and Pearce 1981). In the medieval period the Augustinian Friary appears to have lain between these two branches in which was a lower lying marshy area (ibid.), although it is still not completely certain whether the eastern branch was in existence at this time. The name New Cut is only known from a map dating to around 1600 and not from any earlier periods (Buckley and Lucas 1987: 52). This may mean that the eastern branch was created some time in the medieval or post-medieval period and it was not in existence in Roman times. To create

such a watercourse which was over 500 m long and 25 m wide, however, would have been a monumental task and instead it might be that the New Cut refers to the straightening of an existing course or the creation of a small branch off it for use as a mill leat (ibid.). There are references to a Castle Mill and a Newarke Mill on the New Cut (Mellor and Pearce 1981: 6), indicating that there was considerable use and interference of the water courses in the medieval period. At present it seems more likely that some kind of eastern river branch existed in the Roman period and flowed close to the Roman settlement and there would have been marshy land around it and between the eastern and western branches. This riverside area is also where our current knowledge of Iron Age activity appears to focus including evidence of roundhouses, pits and coin production (Clay and Mellor 1985; Clay and Pollard 1994; Jarvis 1984–1985; 1986; Kipling et al. 2007). Upstream of Leicester on the banks of the Soar was Leicester Abbey which lay partly in the area of what were the floodplains of the river and on an adjacent terrace of higher river gravel. The floodplain was so wet that the area was not used for building again until a drainage and flood prevention scheme was put in place in the nineteenth century (Squires 2006: 76). There are references that this abbey also had watermills which will have influenced river flow but more fundamental changes came later with the canalisation of the river.

Major changes were enacted on the course of the River Exe at Exeter in Devon in the medieval and post-medieval periods and it is now difficult to know exactly what the river was like in the Roman period. The town, and the fortress that preceded it, overlooks the lowest early crossing point of the river around 5 km from the Exe estuary (C. Henderson 1988: 92). From the fortress, the ground sloped down quite steeply to the river (Bidwell 1980: 56). The contours known today can relate only to the modern city because there has been considerable topographical change relating to quarrying from the Roman period onwards and the partial filling in of the valleys. Topographic and excavated evidence indicates that the area between the river and the town consisted of a large marshland. This probably also had higher and drier areas of ground but the extent of this is uncertain. A small number of water-worn sherds of Roman pottery have come from excavations in the area near the Exe Bridge but no archaeological features are known representing Roman activity (J. Allan pers. comm.). The Exe Bridge was constructed in stone in the twelfth century and it was around this time that structures are known to have been built on the riverfront (C. Henderson 1991). Excavations on the waterfront have revealed over 4 m of deposits and the remains of a stone quay built at the beginning of the seventeenth century and an earlier timber

quay represented by a revetment of driven oak stakes and wattles built along the margin of the alluvial bank (ibid.).

The Roman fortress at York was located at the confluence of the River Ouse and the Foss which is a smaller river. At this point the Ouse enters the Vale of York and receives the flow of the Rivers Swale, Ure and Nidd, which drain from the Pennines to the west and the Foss (Lillie and Gearey 1999: 42). The Ouse flowed past the fortress to the southwest whilst the Foss came from the north to meet the Ouse to the southeast of the fortress. The later *colonia* was sited across the other side of the Ouse on the southwest bank and it appears that, though not precisely known, the course of the Ouse probably has not changed to a great extent since the Roman period (Ottaway 1999: 138; 2004: 26). The nature of the Foss, on the other hand, was altered dramatically with the creation of the King's Fishpool (Stagnum Regis) in the late-eleventh century by damming the river and flooding a large low-lying area which was gradually reclaimed not long afterwards as the city expanded (R. Hall 1996: 43). The dam blocked access to the Ouse from the Foss but the river was again altered in the eighteenth century with the creation of the Foss Navigation Company in 1792, which canalised the river, and this was followed by its drainage and the installation of a sewer system in the nineteenth century (R. Hall 1991: 182).

As well as river courses changing over time, which have an impact on our understanding of the relationship between towns and water, there are a number of instances where rivers and streams have now been lost or lie beneath the dense occupation of modern towns and cities, as examined in Chapter 2 in the case of London. These could be linked to the main river or be independent from it but they often formed significant elements of the Roman settlement topography and urban structure. Identifying rivers that are no longer visible in urban settings today demonstrates the extent to which townscapes have changed and remind us of the importance of considering the social implications of rivers in urban settings. At Exeter the Coombe Stream was fed by a spring near the site of the present cathedral and flowed into the Exe near the post-medieval quay front (Bidwell 1980: 44; Hoskins 1960: 5). The only evidence above ground for the stream now is Coombe Street which runs along its former course. At Verulamium there was a small valley representing a streamlet running from a point near the south corner of the *forum* to the River Ver to the northeast of *insula* XVIII (Niblett 2005: 87). It may have been fed by springs or a higher water table in the vicinity.

At some towns, islands are known to have been important elements of waterscapes associated with settlements as could be seen in the examples

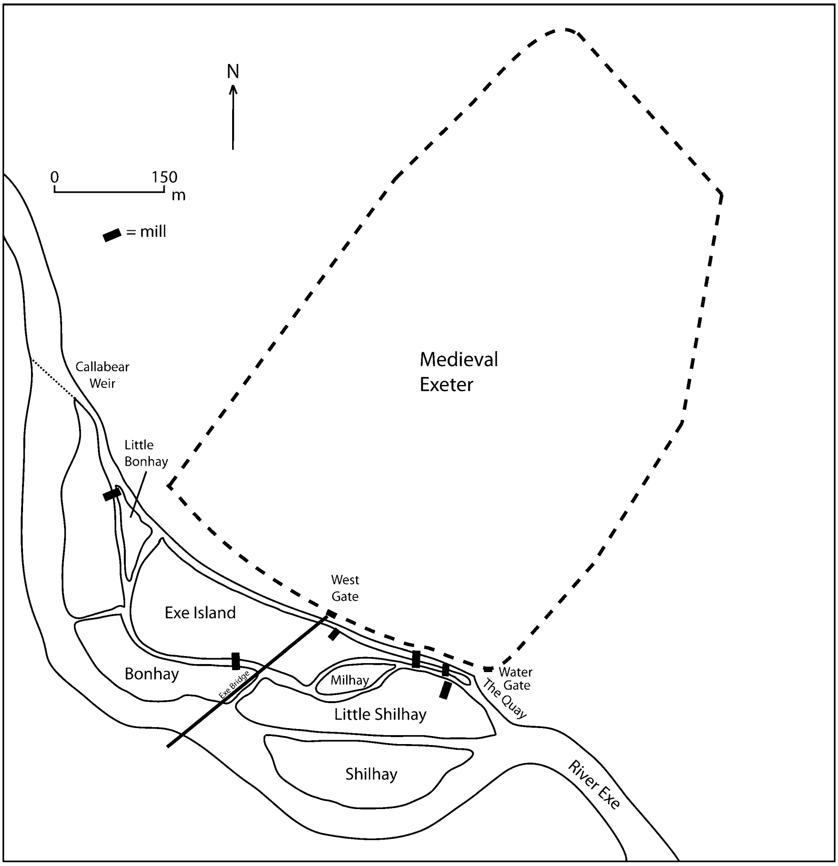

Figure 3.3. Plan of the medieval period river system at Exeter (drawn by A.C. Rogers; adapted from Stoyle 2003, map 4)

in Chapter 2. Some islands known today, however, or known from history were created artificially in post-Roman times and so would not have formed part of the Roman townscapes. At Exeter, for example, around the twelfth century attempts were made to drain the marshy land by the side of the town by cutting new water courses or leats and this created islands within the river that would probably not have existed in the Roman period (Figure 3.3). The largest of these was Exe Island and there are others documented as being known as Silhay and Bonhay, the -hay referring to an enclosed piece of land (Hoskins 1960: 28–29). The construction of the quay at Exeter and the Exeter Canal in the sixteenth century have been well-documented (C. Henderson 1991) and these will have altered the Exeter

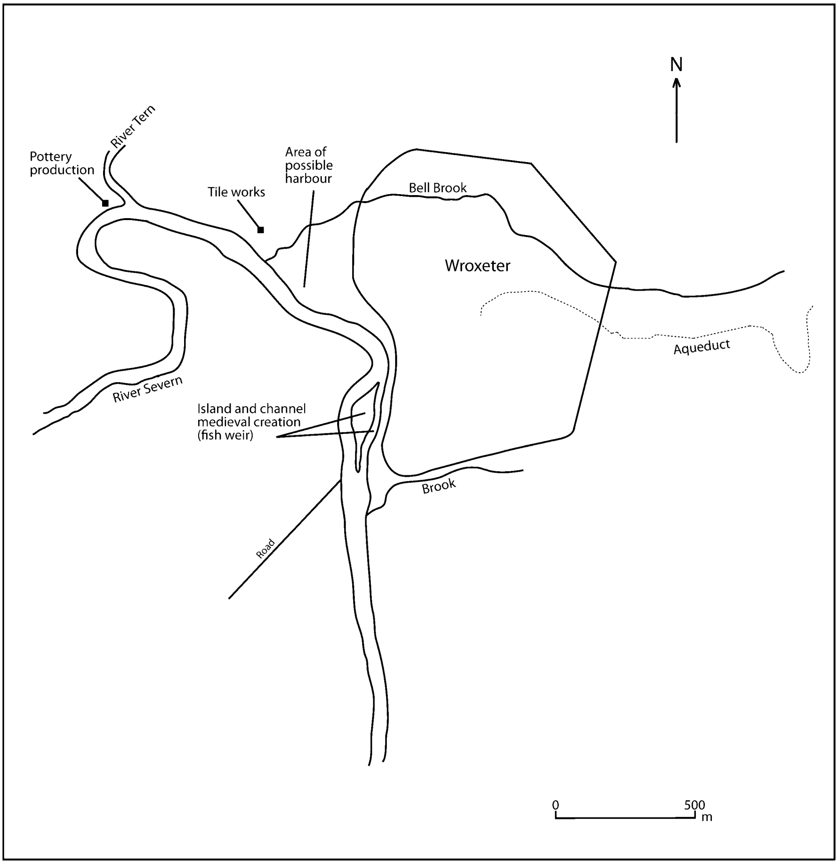

Figure 3.4. Plan of the riverscape at the location of the Roman town at Wroxeter (drawn by A.C. Rogers; adapted from Pannett 1989, figure 1)

riverscape in a major way. As we have seen islands also formed a major part of the topography of London including especially Southwark but also a number of smaller islands which were gradually transformed as land was reclaimed.

The Roman town at Wroxeter was located on the upper stretches of the River Severn where it is characterised by a number of bends and a broad floodplain (Figure 3.4). Within the channel there are gravel ridges creating shallower areas amidst deeper pools. Some of the gravel ridges were used as fords across the river which formed important parts of the pre-Roman road network. The course of the river does not appear to have changed in any major way since Roman times although it does flood almost every year.

There is, however, an island or bylet in the river which was not a part of the riverscape in the Roman period. It was created in later times as part of a fish weir when an additional channel was cut in the river (Pannett 1989: 52). A number of these fish weirs, creating islands, existed in this part of the Severn in the medieval period although most had gone out of use by the seventeenth century (ibid.). Two smaller rivers flow into the Severn at Wroxeter, the Bell Brook and the River Tern (ibid.). The Bell Brook flowed through the northern part of the walled area of the town and effectively created a separate urban section on the northern side of the river valley. It does not appear that the course or nature of the Bell Brook has changed much since the Roman period. The Tern lies upstream of the town and was canalised in later times but it did not have such a direct involvement in the Roman town as the Bell Brook did; although there was a Roman pottery kiln at its confluence with the Severn at Attingham Park around 1 km from Wroxeter (White and Barker 2002: 62).

Islands could play a significant part in the creation of urban topographies in Roman Britain and their role in understanding town development and the urban experience should not be overlooked. Their importance as part of the townscapes includes the religious connotations of islands. Webster's (1995: 451) study of Iron Age religious activity highlighted the importance of islands for cultic practice and the location of shrines. For earlier prehistory, Brown's (2003) examination of archaeological evidence of the use of islands within alluvial floodplains has suggested that the islands appear to have been deliberately used as a focus for activity despite the practical difficulties associated with it and lack of any apparent advantages. Brown concluded that the islands must have had some kind of special meaning or importance that was now difficult to assess. Bounded by water, islands were special because of their liminality and their proximity to the godly world; they were also of uncertain status in terms of land and water (cf. Horden and Purcell 2000; McNiven 2003; Webster 1995: 451). The significance attached to these places may be one reason why they were favoured for ritualised activity in prehistory (cf. Sharples 2010), and chosen as places for the development of towns in the Roman period. The pre-existing geographies were incorporated into the new urban landscapes. It is important when examining Roman period geography that existing features such as prehistoric monuments, rivers, lakes, islands and woods are, where possible, not ignored since they will have continued to form significant elements of the landscape and meanings associated with them may well have survived into later times. Islands are a good reminder of the meanings and activities that can be associated with 'natural' features in the landscape and survive to influence later actions.

Rivers, Urbanism and New Geography

From a general review of the archaeological literature across various period specialisms, written mainly by Western scholars, it is clear that general assumptions regarding the practical importance of rivers and their relationship to settlement continue to be reinforced and lie in the background of most work. Studies of the early civilisations of the Near East, for example, emphasise the role of rivers in the development of complex societies and urban settlements. In Egypt it was the Nile with its floods, land irrigation and transport possibilities (Alston 1995; Kemp 2006); in ancient Mesopotamia it was the Tigris and Euphrates (Matthews 2003; Pollock 1999; Postgate 1992); and the Indus contributed towards the Indus Valley civilisation (Chakrabarti 1995; Kenoyer 1998). Whilst this practical importance of rivers cannot of course be denied, these modern Western perspectives, drawing also on assumptions and traditions central to Economic Geography (see below), neglect the contextual meanings of these landscapes and the water within them.

Karl Wittfogel's (1957) well known study *Oriental Despotism: A Comparative Study of Total Power* was an attempt to develop a model to explain the rise of complex societies and the role of water and water control in these developments. He proposed that a significant aspect relating to the rise of complexity and urban settlement was related to the bureaucratic needs connected with the organisation of large-scale irrigation systems. Although this work is now mainly mentioned in terms of its limitations is does continue to provoke considerable debate as the studies presented in the volume of the journal *World Archaeology* entitled *The Archaeology of Water* (2009; e.g. M. Davies 2009; Harrower 2009) clearly indicate. This volume contained a number of case studies from across the world examining the influence of Wittfogel's model today and continues to remind us that rivers, and their relationship with settlement archaeology, are still mainly examined from economic perspectives. Through such studies, moreover, the relationship between rivers and urbanism can be taken for granted and so the specific nature of this relationship in individual contexts does not always receive as much attention as it deserves. This relationship includes the way in which water was experienced in the urban context, the physical control and manipulation of water, issues of land use and landscape change, and the cultural and symbolic significance of waterscapes and their control.

In Roman urban archaeology rivers, and other elements of waterscapes, do not usually receive much attention beyond general comments on their presence and descriptions of their physical nature, their assumed practical, economic and strategic value for urban development and the inconvenience

of features such as wetlands (e.g. on Britain: Wacher 1995; Webster ed. 1988). Most excavation reports relating to settlements in Britain refer to the economic potential of their location including their proximity to river and road networks (e.g. Ford et al. 2011). Perhaps one significant exception to the treatment of Roman period settlement, however, is in the examination of Rome itself, where the prominence and cultural significance of the Tiber, its floodplain and tributaries has received much consideration (e.g. Aldrete 2007; Herendeen 1986; Holland 1961; Purcell 1996a; Ramage 1983). In studies of the spread of Roman urbanism in the West, rivers are usually considered to have been important factors in the choice of town location but they are generally neglected as elements of the settlements themselves. One reason behind this might be that rivers often flowed outside the town walls (cf. Esmonde Cleary 1987; Goodman 2007) but it is important to examine urban topographies from a wider perspective looking at how rivers, lakes and wetlands formed part of the histories, memories and symbolic meanings of the interconnected surrounding landscape.

Water, of course, is a subject of great international importance as much today as it was in the past with some key issues including the accessibility and cost of water, the excess of water through flooding, climate and landscape change, the issues of drought, sanitation, water pollution, water power and the exploitation of seas and rivers for resources. Urbanism is another global issue with an ever-increasing number of people living in towns and cities around the world (Massey 2007). The expansion of urban centres has major economic and ecological implications as land is engineered, natural resources are exploited and water supplies and drainage facilities are installed (cf. Benton-Short and Short 2008; Kahn 2006). The development of Economic Geography, with its emphasis on spatial analysis, location theory and urban economics, (Coe et al. 2007; Combes et al. 2008; Sheppard and Barnes 2003) has had a major impact not only on studies of urban geography but also archaeology; as we know well from New Archaeology or Processual Archaeology, with its emphasis on models and patterns (e.g. Clarke 1968). Through Economic Geography, the emphasis has been on rivers as transport links and the economic potential of rivers for urban development. Many studies within contemporary urban geography have been concerned with rivers and waterfront areas within towns and cities with publications including *Rivertown: Rethinking Urban Rivers* (Kibel ed. 2007), *Transforming Urban Waterfronts: Fixity and Flow* (Desfor et al. eds. 2010) and *Waterfronts in Post-Industrial Cities* (Marshall ed. 2001). These studies examine issues that face current towns and cities and their rivers such as the impact of the fall of industry on urbanism and the role that the river played as a focus for

industrial activities within the urban setting. They also chart the various responses to these changes which have been attempting to revitalise urban waterfront areas. These include programmes to create commercial districts and luxury living areas, as in London (e.g. Smith Morris 1997), or attempts to create parks, leisure areas, wildlife reserves and protected wetland zones (cf. Desfor et al. eds. 2010; Kibel ed. 2007; Rotenberg 2005).

Notions of understanding Roman town planning have been influential on early modern town plans but at the same time social attitudes of the nineteenth and early twentieth centuries have had an impact on studies of the Roman past. In 1910, for example, the Oxford ancient historian and archaeologist Francis Haverfield gave a paper on ancient Roman town plans at a conference on urban planning in London concerned principally with contemporary social reforms (for a detailed examination of Haverfield and his work see Freeman, 2007, and Hingley, 2000). This talk was published in 1913 and here Haverfield (1913: 14) expressed the view that straight lines and right angles "separate the simplest civilization from barbarism". He was advocating strongly the notion that the Roman conquest of Britain brought civilisation and order to the area in the form of planned urban settlements and public amenities, amongst other things (see also Haverfield 1912; cf. Hingley 2000; Mattingly ed. 1997). Nineteenth and early twentieth century attitudes towards urban rivers, moreover, tended to consider them in terms of disease, poverty and all that was unsavoury and undesirable (cf. Barty-King 1992). There have been a number of later publications on ancient town planning, following on from Haverfield, (e.g. Castagnoli 1972; Ward-Perkins 1974), but these have tended to concentrate on the street networks rather than waterscapes and adopt broadly similar attitudes towards Roman town planning as those taken by Haverfield. This economic approach to town location has considerable value but it important that it is not regarded solely through modern economic understandings and analogies since they are not always suitable for understanding the past and they cannot provide a complete answer. We cannot apply modern values and concerns connected with the relationship between urban settlement and waterscapes to our understanding of towns in the Roman period—indeed, the industrialisation of towns and cities and the commoditisation of water represent major social changes.

Britain also has a rich and important tradition in historical landscape studies with the work of individuals such as W.G. Hoskins, especially, having significant impact. Hoskins' book *The Making of the English Landscape*, for example, first published in 1955, has subsequently been reprinted many times. Though remaining significant work, the studies of Hoskins and others

have also attracted some criticism for what is regarded as the empiricism of their work in reconstructing historical landscapes and their assumption that modern values and perspectives of understanding and perceiving land can be applied to the past (e.g. Cosgrove 1984; Johnson 2007). The work has also been critiqued for the romanticism imbued in the landscape reconstructions. Landscape archaeology has been criticised generally as an 'empirical school' where a preoccupation with techniques to survey and map land has meant that other approaches to understanding land have been neglected (cf. J. Thomas 1993). This criticism can also relate to wetland archaeology and studies of wetland transformation in Britain where there is an important tradition of work but where studies have tended to examine the use and alteration of waterscapes solely in terms of a practical and functional engagement with water (e.g. Rippon 2000a).

It is significant also that recent work to readdress and revitalise 'landscape' studies, such as Johnson's (2007) important book *Ideas of Landscape*, do not mention rivers, or other forms of water as parts of those landscapes, in any detail at all. Theoretical approaches to land and 'landscape', however, can be just as useful for understanding components of waterscapes as land-based elements. As rivers and lakes are usually classified as 'natural' features, moreover, they do not receive as much attention in urban studies as elements introduced to towns and cities such as aqueducts in the Roman period or nineteenth century drainage schemes (e.g. Barty-King 1992; Burgers 2001; Tarlow 2007).

Travel and River Navigability

The navigability of rivers is, of course, an important issue to consider in studying the relationship between towns and waterscapes. On this theme, the focus of investigation has predominantly been on economic issues relating to the movement of people and goods. A central part of river navigability is the waterfront and the infrastructures built in these locations, such as ports and harbours, which will be discussed in the next chapter as another major component of waterscapes. As noted, a considerable influence from Economic Geography, and elsewhere, has been to place an emphasis on the economic relationship between towns and rivers and the issue of river navigability and canalisation. Rivers could be canalised either by being straightened or through creating a completely new waterway to replace or accompany an existing river. The Roman period appears to have been when the first shipping canals were constructed in Western Europe although there

is still much debate over the extent to which canals were used for transport and trade and the extent to which canals were used in Roman Britain remains uncertain (cf. J. Jones 2009; Laurence 1999; Selkirk 1983; C. Wikander 2000: 321–323). The analysis of the towns of Roman Britain, moreover, indicates the pre-existing use of these landscapes appears to have been more important in many cases than their economic potential for water travel (see below; cf. Rogers 2008).

There are textual references relating to canal construction in some parts of the Roman Empire: the creation of artificial water courses. It is clear that they could be monumental projects and sometimes too grandiose to be completed, as in Nero's attempt to create a Corinth Canal to join up two shipping lanes separated by the Isthmus of Corinth (Suet. *Ner.* IX; Dio LXIII.16). Unfortunately the traces of these early attempts at constructing the canal have been lost due to the construction of the canal in the nineteenth century (Grewe 2008: 334). Tacitus (*Ann.* XIII.53) mentions a project to build a canal linking the Saône and Moselle rivers but it too proved unfeasible and it was not managed until the nineteenth century (Grewe 2008: 335). There are records that in 12 BC a canal was completed by Drusus running from the Rhine to the Yssel in the Netherlands (Suet. *Claud.* I; Tac. *Ann.* II.8), but its exact location is now uncertain as no visible traces remain. Tacitus (*Ann.* XI.20) also refers to the construction of canals as a way of keeping soldiers busy and this is also suggestive of the extreme labour-intensive nature of the projects. Canals were a major feature of post-medieval Europe and the social, economic and industrial changes of the period. They were constructed across Britain, especially from the seventeenth century onwards (N. Wright 2001), and they altered existing rivers. They had a major impact on the rivers running through towns and cities, altering the urban landscapes of settlements such as at Leicester, Gloucester and Cirencester. As a result, canals are often associated with notions of progress, economic success and civilisation.

In Britain there has been debate over the extent to which rivers were adapted for water transport in the Roman period for moving supplies and materials around the province, both by constructing dams to create a ponding-up effect and by constructing new channels. Selkirk in his book *The Piercebridge Formula* (1983) stated that waterways would have been the most suitable means of transporting heavy goods around Britain and he argued that dams and pound-locks must have been constructed to make rivers and streams more navigable. It remains uncertain whether the pound-lock was used in the Roman period, however, and there has been little fieldwork carried out that might help to solve the issue (cf. Anderson 1992: 9; F. Moore

1954; Smith 1977; C. Wikander 2000). Anderson's (1992) reappraisal of the Piercebridge Formula argued that much of the evidence used by Selkirk in England was unconvincing; the system of pound-locks needed on the rivers of northern England, for example, would have been too complex to make it feasible (ibid.: 9). Whilst some authors have argued that a number of examples of canals referred to in the textual sources would have been difficult without the pound-lock (e.g. F. Moore 1954; Smith 1977), others have argued that attempts were made to ensure that canals did not have to change level; and that some canals did in fact prove to be unsuccessful (Anderson 1992: 93–94).

Where suitable and desirable rivers would have been used for water transport but it seems unlikely that there was any systematic attempt to construct canal networks in Britain; the idea for which perhaps draws on knowledge of medieval and post-medieval Britain. Any canalisation of a river will also have had a significance both in terms of its functional use and the social impact of altering the riverscape. Tacitus records that the General Gnaeus Domitius Corbulo on duty in the Netherlands in the first half of the first century AD ordered his men to dig a canal (*Fossa Corbulonis*) from the Rhine to the Maas so as the avoid the dangers of the North Sea and to provide them with a task to fulfil (Tac. *Ann.* XI.20). As well as having a practical function it is also perhaps possible to consider canal construction and river canalisation in terms of the manipulation of water, the transformation of land and a statement of power and command of the land.

The rivers associated with the Roman towns in Britain were not always very suitable for transport on any large scale, but this does not mean that they were not significant. The towns were often located in waterscapes that already seem to have been important places culturally in the late Iron Age but the rivers were not necessarily suitable for more than small-scale navigation. Whilst the places were perhaps politically and socially important, they were not always convenient in terms of modern economic thinking and planning. At Caistor-by-Norwich, for example, whilst the River Tas may have been navigable by small boats to the town, in the medieval period it was Norwich around 8 km to the north that saw considerable prosperity because it could be reached easily by boats on the River Yare. At both Canterbury and Cirencester, the rivers were narrow and shallow but flat-bottomed boats could have been hauled up to the towns from landing places downstream.

It appears that in some of these cases unloading facilities were located at a greater distance away and as such this can also be seen as being suggestive of new forms of organisation and behaviour in the landscape. The town at Silchester was not situated close to any suitable waterway for travel and it

drew most of its water from wells and springs (cf. Fulford 2001). It has been suggested that Reading may have served as a river port for Silchester which lay 10 km to the south although more research is needed at this location (Booth et al. 2007: 59). It is likely that portages were important—the paths on which small vessels and goods were carried over land in between stretches of water—and the social significance and traditions that could be associated with portages has been addressed in a publication on the topic (Sherratt 2006; Westerdahl ed. 2006).

At Verulamium a possible point of access by river was identified south of the town along the River Ver at Park Street in the 1950s. Excavations here recorded a double row of oak piles by the edge of what was considered to be the old course of the Ver (Niblett 2001: 102; 2005: 11; Saunders 1961: 118). The remains of a villa were found nearby in the 1940s whilst gravel digging so whether the wharf was connected to the villa or served the town is uncertain. At Canterbury a number of locations are known outside the town which were important points for the loading and unloading of goods. These include Sturry which lies around 4.8 km northeast of Canterbury on the River Great Stour, where there was a road leading to Canterbury (Jenkins 1951: 145). Archaeological work has been limited here and the site is now largely destroyed but early observations did identify a large number of timber stakes supporting a timber sill beam along the riverside which were believed to form a Roman period quayside and there was also Roman pottery here (ibid.). Outside Chichester there appear to have been early port facilities at Fishbourne (see below; Creighton 2006: 54–59; Cunliffe 1971; Manley and Rudkin 2003; 2005; 2006), and another important coastal site linked to Chichester was probably at Dell Quay 1.9 km south of Fishbourne. This was linked to Chichester and Fishbourne by Stane Street. Unfortunately excavation so far has only revealed evidence of a later Roman tile manufacture site and it may well be that earlier port facilities have been lost due to coastal changes (Black 2008: 297).

A number of possible points are known outside Colchester which may have been used to bring goods to the town because the Colne was not easily navigable (Figure 3.5). One site is Mistley 16 km to the northeast of Colchester by the side of the River Stour. No evidence of a Roman port has yet been found here but the modern port lies exactly where a Roman road has been traced running directly from the town (Crummy 1997: 72; Hull 1963: 162; Kemble 2009: 147). To the south of Colchester is Fingringhoe Wick which lies overlooking the Colne Estuary at the point at which the river broadens and deepens before reaching the sea. The site was largely lost to gravel extraction in the 1920s and 1930s but during this activity Roman military equipment

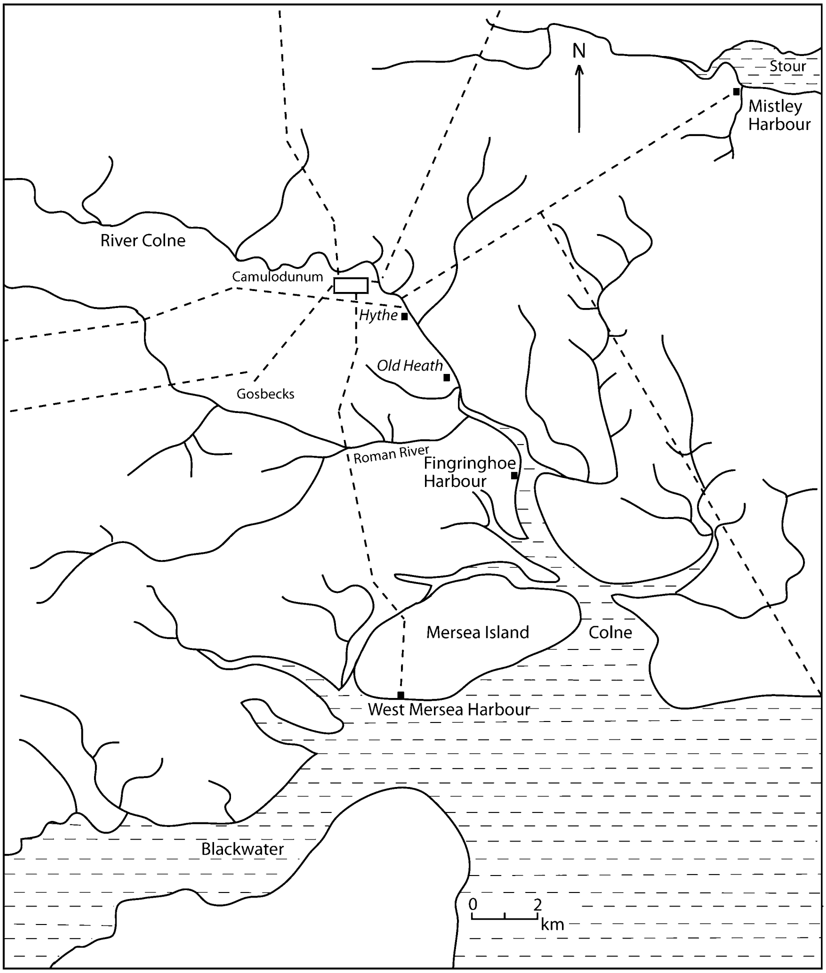

Figure 3.5. Plan of the riverscape at Colchester with the possible port locations used by the Roman town marked (drawn by A.C. Rogers; adapted from Crummy 1997: 71)

and substantial quantities of coins and pottery were found (Crummy 1997: 49). Some remains of Roman buildings have been found here although their exact nature is uncertain (Hull 1963: 131; Kemble 2009: 132). West Mersea at the mouth of the River Colne is a harbour in modern times and there are also some traces of Roman settlement here, although its exact nature is uncertain (Hull 1963: 157–162). The main port for Colchester in the early and later medieval periods was at what was known as Old Heath before

the twelfth century and then became Old Hythe (Cooper 1994: 237). The name was derived from the Old English 'Ealdehether' meaning old landing place (Crummy 1981: 37; Reaney 1935: 376–377), and it lay around 3.2 km downstream of the town at the bank of a meander of the River Colne that has now dried up. After the mid-twelfth century a new port was established at Hythe (New Hythe) further upstream by deepening and straightening the Colne (Cooper 1994: 237). The Hythe was larger than the Old Heath but was still only accessible to smaller craft owing to constant silting (Cotter 2000). It seems that the difficulties relating to the town's location so far from the mouth of the Colne could never be overcome and this may be the result of the desire for the Roman fortress to be established near the Iron Age settlement rather than putting river trade as a priority. It is possible that there was a similar port to the Hythe constructed in the Roman period but no evidence for this has yet been identified (Crummy 1981: 47; 1997: 72). Though waterscapes were used and transformed, then, through river transportation, there does not always appear to have been much in the way of planning to provide the greatest efficiency for river transport.

At Exeter there has also been some debate over whether ships could get up to the Roman town itself or whether instead they stopped 6.5 km to the south at Topsham situated at the head of the Exe Estuary which was a port in the later Middle Ages (Figure 3.6). At Exeter there is very little evidence for any waterfront installations of Roman date but the waterscape was significantly altered in the medieval and post-medieval periods so the evidence may have been lost (C. Henderson 1991). Bidwell (1980: 59) has suggested that the area of the medieval quay was in use in the Roman period but there is as yet no evidence to support this. In medieval times, the quay was accessed using a fifth gate, known as Water Gate, in the town wall which followed the same route as the Roman wall, but it is uncertain whether there was also a gate at this location in the Roman period (Hoskins 1960: 63–64; Stoyle 2003).

Although some Roman remains were found at Topsham in the 1930s there is little to suggest that there was a port or supply base here (Ralegh Radford 1937–1947: 10; cf. Maxfield 1980: 307). In the 1970s excavations took place on the east side of the present town at Topsham and identified some buildings of what appeared to be a farmstead with pottery dating to around AD 50–75 suggesting an early but short-lived settlement rather than a major supply base (Jarvis and Maxfield 1975). Topsham became a port in the later Middle Ages because the channel up to Exeter was blocked off due to the construction of weirs across the river at Countess Wear around 3.2 km south of Exeter (Maxfield 1980: 305). Before this time, then it was probably possible to sail

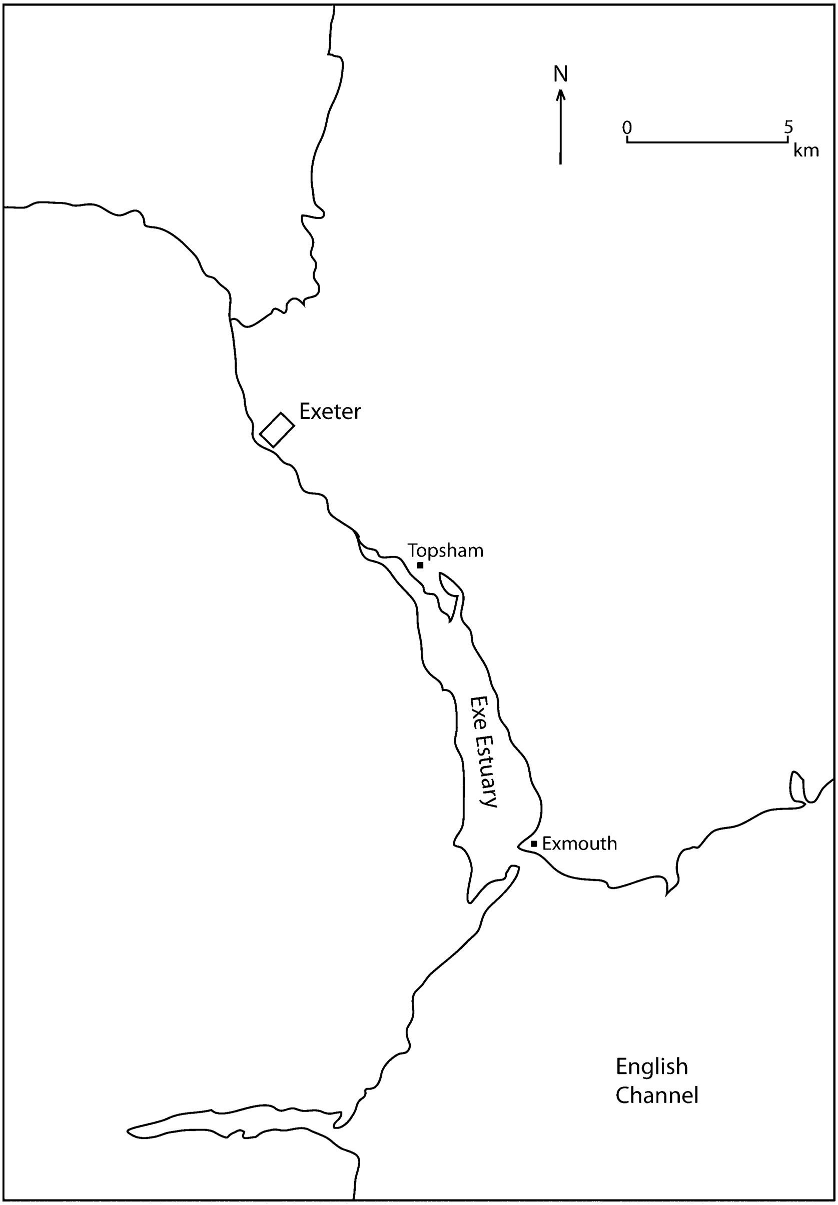

Figure 3.6. Plan of the riverscape at Exeter in relation to the Exe Estuary (drawn by A.C. Rogers; adapted from Stoyle 2003, map 6)

up to Exeter which would have been more suitable than transferring all the goods to carts for a 6 km road journey. The fortress at Exeter which preceded the town was probably deliberately located at the point at which navigation was possible.

The same is also the case with the fortress at Gloucester although here, also, there has been some debate concerning the navigability of the river. The River Severn was capable for larger-scale river travel but it has been the subject of some study because of its tidal bore which was considered might have reduced river traffic because of the possibility of it endangering the stability of ships (Green 1942: 48). The bore is created by the funnel shape of the Severn estuary and develops in the sand-locked channels of the lower estuary. It is fully grown when it has run upstream into the relatively narrow inland river (Rowbotham 1970: 19). Before Sharpness, the river channel varies greatly in width and depth from place to place and so the bore is not very significant. Once past Sharpness, however, the bore begins to form as the river straightens out towards Gloucester. Navigability on this stretch of the river would have been more difficult but not impossible (ibid.: 82; Kissack 1982). The silting of the channels at Gloucester in the medieval period, however, was a more major problem, and led to Bristol eclipsing the city around this time (Heighway and Garrod 1981: 123).

At Lincoln the River Till connects with the Brayford Pool and River Witham and it appears to have been canalised at some point to create the Fossdyke. There has been considerable debate to the extent to which the river may have been used for the movement of goods as part of a network of inland waterways in the Midlands in the Roman period, as seen in Chapter 2. Unfortunately the exact date of this event is uncertain or the nature of the original course of the river (M. Jones 2003: 116). It is possible that these changes occurred in post-Roman times as there is only a small amount of evidence which is not especially reliable. The next section of this chapter will discuss further the evidence of the diversion of rivers, which was not always connected with the desire to improve river navigability. Discussions of the location of Roman London continue to be dominated by considerations of its position on the Thames for access by boat and also as a crossing point for roads (e.g. Watson et al. 2001; Perring 2011). London certainly makes the most convincing case for an economic and strategic understanding of its location but pre-existing cultural meanings associated with the landscape and river must also not be neglected (cf. Rogers 2008).

It is also important to approach the significance of river travel and its connection with urban space in a more nuanced way beyond the practical considerations. Waterfronts were points of departure and arrival. They can

therefore acquire special significance relating to the danger and exoticism of crossing water, a liminal boundary, and through bringing knowledge, people and objects from far-away places (McNiven 2003). The journey itself would have been a highly meaningful undertaking involving people's engagement with the water (cf. Cummings and Johnson 2007: 2). Indeed, movement is an important way through which the landscape is experienced (cf. Bender 2001; Laurence and Newsome eds. 2011; O'Sullivan 2011; Tilley 1994). Cummings and Johnson (2007: 1) have emphasised that the time that passes in between departure and arrival is often no less important or memorable than experiences gained at the points of destination and departure. Start and end points, however, such as waterfronts can become important because they become imbued with the histories of the journeys.

The significance of journeying must also be contextualised since it cannot be assumed that journeys will have had the same significance in all periods (Cummings and Johnson 2007: 2); travelling on rivers will have been imbued with meanings relating to cultural context and belief. Herendeen (1986: 42), for example, has described how in Classical thought the benign river is seen as a symbol of hospitality welcoming travellers who see themselves as bringing civilisation and virtue to their destination point; a raging torrent, however, is punishment from the gods. Virgil describes how the river was made calm for Aeneas' travels as he approached the Tiber mouth from the sea (*Aen* V.450–453). The flow of the river can also articulate ideas about time. With the nature of river flow, journeying on rivers can reflect ideas about the progression of human life (Strang 2008) but travelling upstream against the current can be symbolic of travelling back in time with inland areas becoming more primitive as they get further from the coast (P. Jones 2005: 97).

Whilst this comes from the poetical thoughts of Classical elites, there are also archaeological indications from Britain and other areas of northwest Europe for the significance of journeying and the dangerous associated with it. At two sites in the Netherlands, Domburg on the coast of the former island of Walcheren and 25 km to the east at Colijnsplaat on the coast of the former island of Noord-Beveland, there were shrines to the goddess Nehalennia. These sites were also important harbours serving ships trading between the coastal regions of Gaul and the east coast ports of Britain as well as between the Rhineland and Gallia Belgica. Unfortunately, very little is known about the harbour structures but traded goods have come from the sites as well as tiles with the imprint of the Roman Navy (Hondius-Crone 1955). It is thought that the name Nehalennia might mean 'guardian' or 'guiding' goddess reflecting the desire of traders to seek protection before they embarked on journeys

which could be dangerous. Whilst an equivalent shrine, and concentration of altars and statues, is not yet known in Britain, a plaque dedicated to Ocean and Tethys, his wife, is known from York dating to the AD 80s and relating to the same concerns of safety (Braund 1996b: 12). Altars dedicated to Neptune and Ocean are also known from Newcastle (ibid.: 12) and it could be argued that the monumental triumphal arch constructed at Richborough in Kent (Strong 1968) after the Roman invasion here suggests an attempt to reflect not only the power of conquest of land but also of Ocean.

Diverting Rivers: Manipulating the Relationship between Land and Water

Rivers formed significant components of the urban topography that had to be negotiated; and they were used and acted upon by the inhabitants. In some cases this took on an additional aspect with the relationship between urban space and rivers being deliberately altered by human activity with the diversion of rivers onto new courses, as examined for Winchester and Cirencester in Chapter 2. As well as changing the urban experience these activities have wider implications regarding attitudes to altering land and places as well as practical aspects relating to the availability of people and resources for the work to take place. This section is going to explore the way in which urban topographies could be altered through river diversion putting the evidence from Chapter 2 into more context. There are also cases where river diversion in the Roman period now seems unlikely when it was previously thought that it did occur.

Both Canterbury, as already seen in Chapter 2, and Chichester are examples of towns where it has been assumed in the past that rivers must have been diverted in the Roman period either because of the course of the river today or the nature of the landscape which would have been far wetter in the Roman period than it is today. At Chichester it has often been argued that the river, the Lavant, was diverted in the Roman period but whether this did actually occur at all, let alone in the Roman period, still remains unclear (Figure 3.7). Chichester lies on a well-drained site and rather than moving the river away from the town it has been argued that the river may have been brought closer to the settlement in order to act as a water supply (Down 1988: 41). The river channel does have an artificial appearance running in a canalised form along the Roman road towards the town and then around the south side of the walled area (Cunliffe 1971: 5; Wacher 1995: 264). It appears that the river may have travelled along its natural course

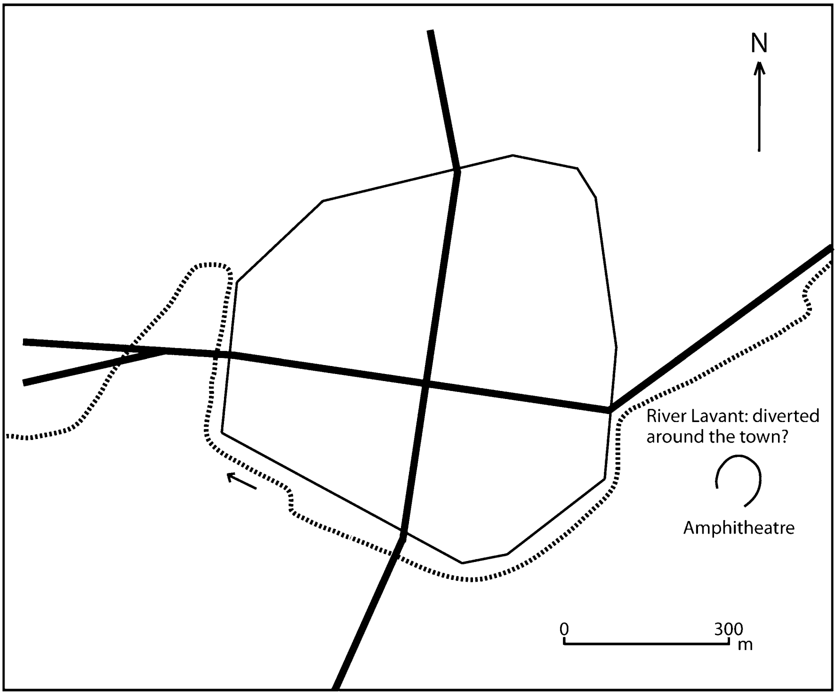

Figure 3.7. Plan of the location of the River Lavant in the relation to the Roman town at Chichester (drawn by A.C. Rogers; adapted from Cunliffe 1971, figure 15)

until about 1.3 km northeast of the town when it was then diverted along the line of Stane Street and around the east and south sides of the town before heading to Pagham Harbour (Magilton 1996: 39). One suggestion is that it was used as a water supply for the bathhouse (Cunliffe 1971: 56) but it is now known that the bathhouse was supplied with water from a large well and cistern whilst the high water table would have meant that wells were an easy form of accessing water throughout the town. In light of the fact that the river appears to skirt around the outside of the town walls, Down (1981: 84) has suggested a number of possible reasons and dates for the diversion of the river but he took a military perspective: the diversion formed part of a late Roman defensive project at the same time as the addition of the bastions on the town walls, or it formed part of the refortification of the settlement as a burgh in the late-ninth or early-tenth century or it was diverted when the town defences were re-planned in the fourteenth century. Unfortunately the lack of good dating evidence makes any stronger conclusions difficult.

Magilton (1996) supports the view that the river was diverted at some stage but has put forward a different argument for a possible date and reason: to supply watermills in the medieval period. Mills are known through documentary records at the point at which the river ceases to follow the line of the road and instead follows the course around the town periphery. The difficulty is that there is a lack of good archaeological evidence to support the association between the mills and the Lavant and the alteration of its course. The fact that the river does follow the line of the Roman road and town walls is certainly suggestive of intervention in the Roman period but more archaeological evidence is needed before any conclusions can be made.

It has sometimes been argued that there was an additional artificial channel of the River Tas at Caistor-by-Norwich cut immediately outside the northern walls of the town that would have been used for small boats (Figure 3.8; J. Davies 2001; 2009: 171). This suggestion was based mainly on the signs of a possible channel in aerial photography. The town walls on this northern part of the circuit also appeared to have been less substantial than on adjacent stretches and this was explained by there also being a water channel here providing an adequate boundary. Recent detailed landscape survey work has now indicated that the channel probably did not actually ever exist (W. Bowden pers. comm.). The less substantial wall remains may relate instead to heavier post-Roman robbing of the flint here. Firmer evidence for the manipulation of the river course in the Roman period comes from Verulamium. The Roman town lies on the south-eastern fringe of the Chiltern dip slope which forms a chalk plateau sloping down towards the east. The town grew up at the point at which the deposits of clay with flints and plateau drift which overlie the chalk plateau give way to the boulder clay in the Vale of St Albans (Niblett 2001: 29). The plateau is cut by a number of small river valleys including the River Ver (ibid.). In the 1950s, excavations outside the Roman town walls in the valley floor identified a monumental chalk and clay embankment 7.6 m wide constructed on the north side of the Ver (Figure 3.9; Frere 1983: 277). Pottery finds suggested that it was constructed in the earlier part of the third century, and it appears that it would have channelled the river waters, controlling the direction of its course (Frere 1983: 277–281; Niblett 2005: 88). Such a scheme would clearly have involved considerable resources, labour and expertise.

Niblett (2001: 124) has suggested that the controlling of the river in this way may have coincided with the construction of the town walls in the third century. It may have formed part of the prestige associated with the building of the town walls and the reorganisation of the landscape; it was a

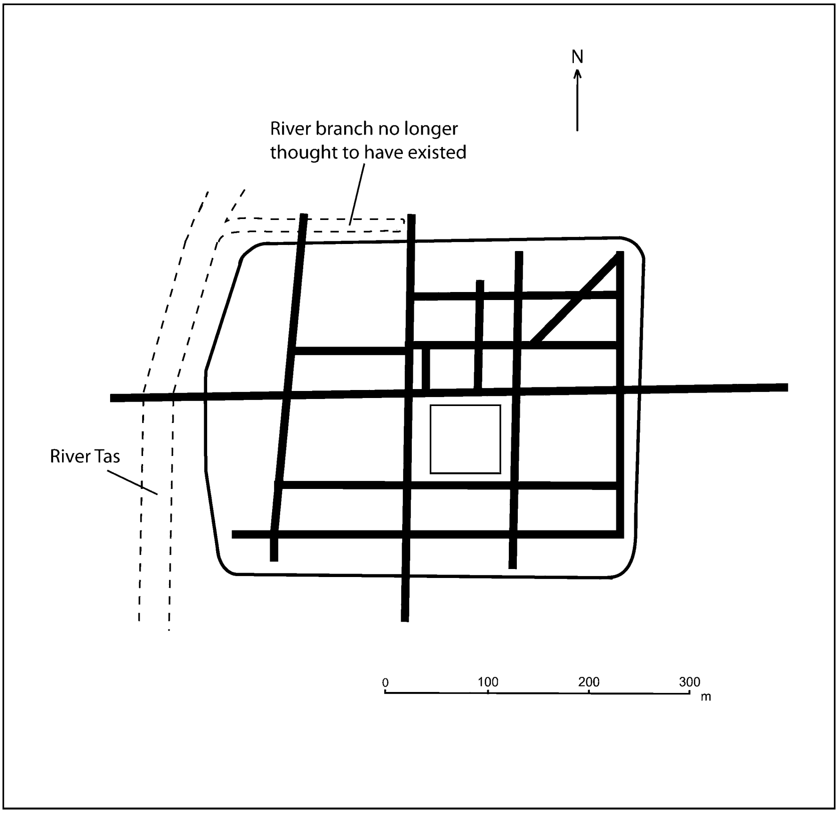

Figure 3.8. Plan of the riverscape at the Roman town of Caistor-by-Norwich (drawn by A.C. Rogers; adapted from J. Davies 2009, figure 149)

demonstration of power and wealth. Alternatively, the river may have been redirected for other purposes such as to provide a more stable water supply for watermills downstream (see Chapter 2). The results from Frere's (1983) excavations, however, suggested that the redirection of the river did not last very long since flood deposits dating to the second half of the fourth century indicate that the river was no longer confined to the embankments and probably reverted to its original pattern of flow.

As we have seen, much more substantial evidence of deliberate river diversion in the Roman period comes from the towns of Cirencester and Winchester. In both cases through detailed archaeological investigative work on the nature of the pre-Roman landscape and developments in the Roman period it has been possible to demonstrate the way in which new

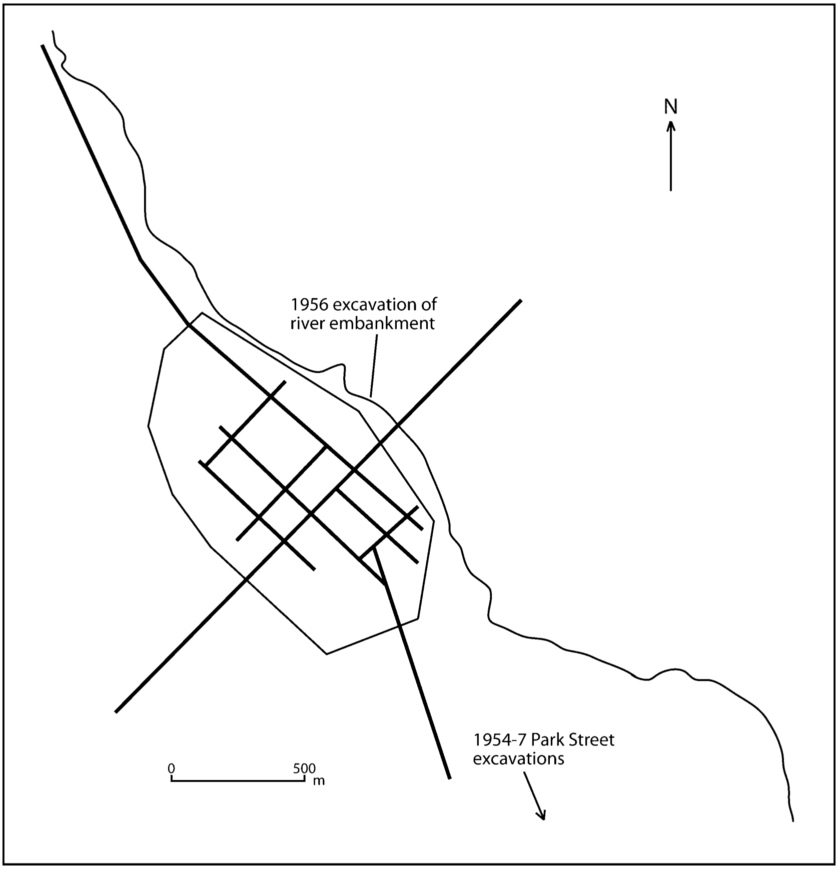

Figure 3.9. Plan of the riverscape at St Albans (Verulamium) (drawn by A.C. Rogers; adapted from Niblett 2005, figure 4.73)

artificial river channels were created around the outside of these towns in Roman times (Broxton and Reece 2011; Reece 2003; Qualmann 1993; Scobie 1995b; Scobie et al. 1991). This resulted in a fairly substantial alteration of the landscape in which the towns were set combined with other activities such as wetland drainage. The effort gone into this work suggests that there would have been major cultural implications as well as practical outcomes and would seem to indicate that these places must have had more significance than simply their practical value.

Unlike the 'large' or 'official' towns there seems to have been far fewer attempts to artificially alter waterscapes in the vicinity of 'small towns'. Our knowledge of 'small towns' and how they were integrated with their

surroundings, however, is still very much in its infancy compared with the large towns and forts. Excavations at Ilchester in Somerset, however, have provided some evidence of possible river redirection and canalisation in the Roman period. Ilchester was set on what was technically a small gravel island within the floodplain of the River Yeo and at a river crossing point. It lay at the head of the Somerset Levels, an extensive area of low-lying wetlands, and an area dominated by the broad river valleys of the Yeo and the Brue and Carey to the north-east (Leach 1994: 6; Putnam 2007: 72). Geological and geoarchaeological work around 200 m downstream on the Yeo has raised the possibility that at least part of the river was canalised in the Roman period. Analysis of material on the north bank of the river indicated an inverted sequence of alluvium covered by gravel and then redeposited lias, which would have come about by making alterations to the channel (Thew 1994). What suggests that it was possibly Roman in date was that it was sealed by what was probably post-Roman alluvium and it lay at the same level as Roman material on the riverbank (ibid.). The altered river, then, appears to have formed a significant part of this settlement topography. The exact benefits of this straightening are not yet fully understood as it may have allowed the water to flow faster, perhaps for use as a mill race, but it may also have increased the risk of flooding (ibid.); a fact that may not have been recognised at the time. Whilst there are likely to have been waterfront installations here in the Roman period, they are not yet known and traces of a possible stone quay here are probably of medieval date (J. Jones 2009: 54). Whilst this watery setting probably did have some practical function, it was probably also associated with longer-term meanings perhaps relating to the use of the area in the Iron Age, for which material is known but it is still poorly understood (Leach 1994: 3).

A number of other small towns are known to have been located within low-lying watery areas such as Alcester on the confluence of the Rivers Alne and Arrow in Warwickshire (Booth 1994: 1) and Springhead in Kent (Andrews et al. 2011; Harker 1980),[2] but there is as yet no comparable evidence to Ilchester for any alterations to the rivers. It is possible that 'small towns' reflect to a greater extent indigenous and local ideas about landscape use and settlement

[2] Excavations at Springhead ahead of the construction of the Channel Tunnel Rail Link (High Speed 1) were able to elucidate more details about the history and development of the site (Andrews et al. 2011). The sheer quantity of artefacts including coins, brooches and other items indicated the site's importance and in the late Iron Age a deep ditch was constructed which appears to have enclosed the wetlands and surrounding area. Then in the Roman period the significance and veneration of the site continued with the construction of the complex of seven temples and associated structures and settlement.

organisation (cf. Hingley 1997b) and so in fewer cases was it deemed desirable, as well as perhaps feasible with the available resources, to alter the rivers in any major way.

Moving Water and Changing Land: The Symbolic Context

In many cases, the diversion of rivers would have been a major undertaking involving huge levels of resources, energy and time and it would also have had an impact on those owning or using the land in their vicinity. The act of diverting a river was a major human intervention in the landscape and a significant element and demonstration of what it was possible for humans to do to the land. Diverting a river in this context will also have had the effect of further monumentalising it as it became an integral part of the townscape. It may also have been regarded as an attempt to demonstrate power over the river. Being prepared to undertake the changes, moreover, will not only have involved resources and energy but may well also have required specific cultural attitudes towards land and water perhaps demanding the need for official sanction. At Canterbury the river and its floodplain within the Roman town also formed an integral part of the pre-existing late Iron Age settlement (Frere 1977: 423; Haselgrove 1987: 444–453), perhaps too important to be moved in any way. Altering rivers would not only have involved practical considerations but will also have had social and religious implications.

There are no textual references relating to Britain but there are texts that refer to cases elsewhere; although care is needed to ensure that the contextual significance of each case is not neglected and there is not too much reliance on the viewpoints of the elite. There are records, for example, of disputes relating to the rivers and streams to the north of, feeding into, the Tiber and they give some indication of the cultural as well as practical significance of changing rivers. Tacitus (*Ann.* I.79) records that local communities were fearful that artificially changing the flow of the waters would affect the local area by causing flooding. As well as this, however, other objections were raised relating to the fear of the consequences of human intervention meddling in hallowed watercourses combined with concerns that the actions would reduce the force of the Tiber and its deity (Tac. ibid.). In ancient myths, human intervention in river flow was sometimes portrayed in terms of individuals grappling with rivers in the form of gods; these tales also represent the constant human struggle with the environment. This can be seen, for example, in the conflict between Heracles and Acheloüs, the deity of the largest river in Greece, (cf. R. Taylor 2009). This myth is referred to

by later writers who suggest that its origins may have related to an event where attempts were made to divert a section of the river or embank it so as to control flooding and create further agricultural land (Diod. Sic. IV.35.3; Strabo X.2.19). The symbolic and religious significance of these waterscapes might help us to develop understandings of the meanings associated with artificially altering rivers and other watery contexts as towns developed. As urban spaces developed alterations to the land would not have been regarded in neutral terms and they will have provoked a variety of social responses relating to land transformation.

One possible response that can be identified through archaeological remains is ritual deposition and it does appear that there is some evidence of ritual acts relating to river diversions, perhaps in a desire to placate the gods. During Frere's excavations of the river embankment at Verulamium he identified what appeared to be evidence of at least two coin hoards, or perhaps separate votive deposits of coins, within the floodplain. Faint traces of a wooden box also survived containing 28 coins of the third and fourth centuries and there were a further 94 loose coins of a similar date range (Frere 1983: 280). There were also other objects that were probably votive deposits including two pewter plates, a pewter cup, two brooches, six bronze pins, a bronze bell, four bronze rings, a silver spoon, an iron hook and a knife (ibid.). These finds probably relate to religious activity connected with the river and its floodplain but the date of the coins and the pewter vessels suggest that deposition may have intensified when the river was diverted, perhaps because of the tensions caused by altering the land.

Without any inscription, dedication or other form of record, it is not possible to know who initiated and undertook the river diversions associated with towns, although the dating evidence and scale of each work is potentially informative. At Cirencester and Winchester the alterations were associated with the development and expansion of the towns. This, and the scale of the work, together with implications relating to land ownership, suggests that the actions may have been initiated on an official level perhaps carried out by the army though possibly involving local labour. In these instances this labour would probably have involved slaves, perhaps even provided by the local elites. In consideration of the scale of the work—digging through and moving solid rock and redirecting water—the new river channels can be regarded as monuments in their own right and not only comparable with Roman public buildings but also prehistoric monuments in Britain which involved massive reshapings of the landscape. Prehistoric monument building set a precedent for the interaction between the mundane and the supernatural but did not involve the movement of water.

The alterations at Verulamium did not apparently take place until the third century and may represent a local decision perhaps even involving local funding and paid labour rather than slaves. It is also important to recognise that it is possible that the form the labour took on these projects drew on pre-existing local modes of organisation where people may have been encouraged to come together and take part in large works which formed an aspect of social cohesion and involved feasting and religious activities (see Chapter 5; cf. Sharples 2010).

These changes can also be seen in the context of increased landscape exploitation and represent social changes in attitudes to land use and manipulation (see Chapter 4). Depending on the people that might have been involved in these activities, it might also be possible to consider some cases in the wider context of Roman imperialism and the nature of conquest. Diversions were attempts to control the rivers and the places through which they flowed. Unlike the Tiber flowing through Rome, it is possible that officials were more prepared to alter other rivers in the Empire; as Herendeen (1986: 70) has put it, there may have been a desire to define the limits of the rivers in the conquered lands, reshape the physical world and make all rivers "aqueducts leading to Rome". Alternatively, in some cases at least, local attitudes to their places may have changed as peoples wished to adopt, or were influenced by, more Roman ways of living (cf. Creighton 2006; Millett 1990). This would have included new ideas about the extent to which it was acceptable to alter the land in which they were inhabiting which may especially have encouraged changes to rivers in the mid- and later Roman periods. Though focusing on rivers, and other forms of water, and the way in which they formed part of the urban structure, there is considerable scope for wider themes relating to identity and Britain's position within the Roman Empire and these ideas will be explored further in the chapters that follow.

Bridges and Crossing Points

A significant element of the experience of waterscapes is the crossing of rivers and traversing of wetlands and these actions could also form an integral part of urban spaces. The Wigford Causeway at Lincoln, for example, crossed the marshland of the Wigford suburb area and over to the 181–183 High Street island in the Brayford Pool (M. Jones 2003: 97). A similar causeway crossing Southwark, on a timber corduroy base, formed the backbone of the early settlement on the north island probably from the AD 50s, when crossing the

Thames may still have been by ferry (Drummond-Murray and Thompson 2002: 14; Sheldon 1978: 27). Fording points also formed important, ritualised and historic parts of settlements; many of these were in use before the Roman conquest as at Wroxeter across the Severn (Pannett 1989), Canterbury across the Stour (Lyle 2008) and Winchester over the Itchen (Beaumont James 2007: 33). Where bridges were constructed for the first time, such as at London and Lincoln, they will have on the one hand cut through the land creating a new means of traversing the waterscape. Durán Fuentes (2011: 137) has emphasised the power that bridges could have in transforming the places where they were built. On the other hand bridges were also highly symbolic and ritualised structures and will have formed a significant part of the existing cultural landscapes and will have acquired added landscape value through their use over time.

It is also important to note that towns often appear to fit into the pre-existing cultural geography of the area as represented through the direction of the street grid of the towns. It is highly noticeable in a number of cases that the street grids are directed towards rivers. This could be explained by focusing on the practical role of the river but it is also important to address the cosmological considerations in settlement and landscape use drawing on pre-existing meanings associated with areas. Noticeable examples where the town street-grids are directed towards the river include Leicester, London, Wroxeter, York, Caistor-by-Norwich, Exeter and Gloucester (see figure 3.2 for a plan of the street grid at Leicester). Some obvious examples in France include Amiens and Paris, in both cases the rivers forming integral parts of the urban layouts. Crossing points, often leading to the construction of bridges, may have formed an important aspect of the cosmological considerations in these places. The significance of the geography of towns and movement within the landscape will not have been mundane but imbued with considerable meaning from pre-existing associations with the land.

Bridges themselves were physical structures but they were also liminal settings for human action in that their nature and location was difficult to define—they were neither land nor water nor air. Their association with water, crossing rivers, was especially symbolic and had religious connotations. It is known that bridges were imbued with religious meaning in the Roman period and they provided foci of religious observance (e.g. Aldrete 2007; Holland 1961). Braund (1996a: 45) has argued that in some cases at least the bridge could have been regarded as an act of chaining the river. It appears that the first bridge across the Tiber, the *pons Sublicius*, was regarded as being a major religious undertaking and rituals were performed on it regularly afterwards by the Vestals and *pontifices*, a term which probably derives

from what translates as 'bridge-builder' (Braund 1996a: 45; Holland 1961; O'Connor 1993: 2). As Dilke (1971: 33) has put it, "bridge building was regarded as needing some sort of magic powers". Bridge building was also used with great symbolic effect in the expansion of the Roman Empire. Caesar's (*B. Gall.* IV.17) construction of his bridge across the Rhine was followed after a few days by its deliberate destruction suggesting that the bridge could have been built as a sign of his technological and military strength as well as his power over the river god. O'Connor (1993: 2) makes the important observation that both the columns of Trajan and Marcus Aurelius depict the Roman armies crossing the Danube by a floating bridge and in each case they are being watched by the river god. As Braund (1996a: 46) argues effectively, the river's support and assistance in conquest were used to emphasise the correctness of Roman imperialism. The rivers and bridges were elements with symbolic meaning that allowed the Romans to tame the landscape: "the natural world was at one with Roman imperialism".

Unfortunately there is very little evidence surviving of Roman urban bridges in Britain, probably because they were mostly constructed in timber and they were often replaced in post-Roman times (cf. O'Connor 1993: 145). River banks have also changed dramatically due to erosion and construction work and the evidence may have been lost. Dymond's (1961) catalogue of known and possible bridges in Roman Britain shows that the available evidence concentrates in northern Britain with stone bridges associated with Hadrian's Wall and outlying forts. Even at London a number of uncertainties remain regarding the Roman bridge across the Thames, and there is as yet no known positive evidence surviving of the structure itself; although the possible remains of a pier base for the bridge consisting of a timber box-like structure were found at the Pudding Lane excavations (Brigham 2001: 31). There is also some debate concerning the date at which the first bridge was actually constructed (Milne 1995: 54; Perring 1991: 5). The timber pier may also have been an earlier phase of bridge before stone piers were constructed, probably in the late first or early second century (Brigham 2001: 30, 44). Despite this lack of knowledge of the bridge there is some evidence of religious activity associated with it. In the early nineteenth century, thousands of Roman coins were recovered from the Thames during the rebuilding of London Bridge and during subsequent dredging operations to deepen the river channel and remove submerged remains of the previous bridge (Rhodes 1991: 179). This concentration of coins near the line of the bridge may indicate that coins were deposited into the river from the bridge or that there was a shrine on the bridge itself encouraging devotion (ibid.: 183). As well as allowing passage across the river, the bridge may have controlled

shipping on the Thames, with officials being able to monitor what passed under it and perhaps extract tolls (Brigham 2001: 39).

Our knowledge of bridges associated with other towns of Roman Britain is still fairly limited. At York, excavations at the Wellington Row site near the riverfront of the *colonia* identified a raised area of layers of cobbles and gravel which probably formed the base for a bridge across the Ouse to the fortress but nothing is known of the superstructure (Ottaway 2004). Morris (1927–1928) argued that stone blocks identified in the River Severn at Wroxeter represented a Roman bridge and this argument was adopted by Dymond (1961). Further investigation within the river at a time of drought with very shallow water, however, suggested that these stones may instead have related to a medieval weir (Pannett 1989: 52).

Smaller rivers and streams within towns are also likely to have had bridges, such as across the Walbrook and its tributaries and the Southwark channels in London (e.g. Hill and Rowsome 2011) and the Bell Brook at Wroxeter. It could be argued that the proliferation of bridge structures in the post-medieval period, many using new technologies, in all urban settlements has influenced our perceptions of the urban experience where we pass above the water and often barely notice the river below. In pre-Roman Britain, fords appear to have been a much more common form of river crossing and fords will have brought those crossing the rivers into much closer contact with the water, making the crossing a more physical experience; with fords, too, there will have been much less artificial change brought to the rivers themselves. Bridges will have had a significant visual impact on the landscape as well as altering the way in which the land was traversed.

Conclusions

This chapter has sought to examine the way in which rivers and interconnected components of waterscapes in Roman towns formed a significant part of the urban settlement record and the way in which geographical and geoarchaeological approaches as well as social interpretations can be used to understand this relationship. Waterscapes, including rivers, lakes and wetlands, were as equally important aspects of towns as the built environment of public buildings, domestic structures and town walls and they will have been negotiated and experienced on a daily basis. The rivers were acted upon through human behaviour and experience and cultural values were attached to them. It is important, then, to attempt to reconstruct past waterscapes but move beyond purely descriptive approaches. Redirecting the course of rivers

represents a significant addition to the way in which these landscapes were artificially altered and monumentalised. Rivers had an architectural element that was meaningfully constituted (cf. Tilley 1994; McFadyen 2006 on architecture) and in turn they will have had an impact on the urban experience. Unlike architecture, however, the significance of rivers can go beyond their channels and influence the nature and human experience of the banks and wider surroundings.

The developments in urban settings can also be viewed in the longer-term context of landscape change in Britain and diverting rivers are likely to have formed a highly symbolic aspect of this change because of the religious connotations of watery areas. Moving rivers would have been a major undertaking involving skill, labour and resources as well as the resolve to initiate the task. Urban riverscapes were also altered considerably in medieval and post-medieval times as confidence and resources grew and attitudes towards land and water changed with it. The next chapter will discuss waterfronts as components of urban waterscapes and especially the development of port and harbour installations. Theoretical frameworks more common to maritime archaeology can be of use here to consider the nature of the human interaction between the land/water interface in these contexts.

The Artificial Contexts of Water in Towns: Manipulation and Control

As well as rivers, streams, lakes and ponds, water in Roman towns would, of course, also have been found in a number of different purpose-built locations including aqueducts, water pipes and bathhouses. Although this book is not focusing on these aspects of the urban infrastructure they can also in some way be seen in terms of the way in which water was increasingly controlled and manipulated in these contexts and it is useful to review some of the evidence in Roman Britain here and think about it from a more social perspective. Hodge has argued that rivers are unlikely to have been used as much as we often assume as a source of water in the Roman period (2000b: 27; 2000c); even for towns in close association with rivers, other sources of water would also have been sought through constructing aqueducts and using wells and springs. Stephens (1985: 201) has argued that most, if not all, Roman towns in Britain may well have had aqueducts of some kind to provide some of the water supply even if the towns were located in river valleys; and this would support the idea that there were different perceptions of the various sources and their uses. These aqueducts would have run along

the ground as ditched earthworks, appearing more like canalised streams, which is likely to mean that there are still some structures that have not been recognised or have been destroyed by later activity. Archaeological evidence for what may have been aqueducts in urban contexts is known at Winchester, Leicester, Lincoln and Dorchester and it is interesting to note that these are all towns where there was also a relatively easy access to water from rivers, springs and wells. As well as performing a practical role, these aqueducts would have represented power through the control of water.

South of the town at Leicester is a stretch of monumental earthwork known as the Raw Dyke with a length of around 110 m surviving (Figures 3.10 and 3.11). It consists of two parallel banks around 20 m apart with a channel in between them. A section cut through the earthworks in the 1930s produced a small number of sherds of Roman pottery which led to the suggestion that the earthwork was of Roman date (R. Wright 1939: 208), but there is no further evidence that is able to support this and the definite interpretation of the function of this structure remains elusive. The earthwork was subject to antiquarian work and these early attempts to interpret it as an aqueduct have continued to influence explanations of the feature. Throsby's 1791 account of the earthwork suggests that the feature was probably originally greater in length and that it may have reached the town (Throsby 1791); much of the earthwork was destroyed in the industrial period especially by the construction of the railway. Kenyon (1948: 40–41) suggested that it may have taken water from the Knighton Brook, a stream which flows into the Soar south of Leicester, up to the town as an aqueduct. If this was the case, then it would have brought water into the town at quite a low level and may have needed to be lifted up by waterwheels before being redistributed (Wacher 1995: 351–352). A clear functional explanation for the Raw Dyke, then, remains elusive but it was clearly a monumental construction cutting through the land and may well have been involved in manipulating water in the landscape.

At Lincoln there is a pipeline encased in *opus signinum* running into the north side of the Upper City which may have been an aqueduct. Its source was possibly the Roaring Meg spring which is near the course of the pipeline but a pump would have been needed to lift the water up to the aqueduct for which there is no evidence surviving (M. Jones 2003: 118); alternatively the source may have been on higher ground to the north. The investigations of the aqueducts at Wroxeter and Dorchester have a long history and both are relatively well known although, unfortunately, the evidence of the aqueduct at Wroxeter has now been mostly ploughed away (Pocock 1933–1934; Webster and Hollingsworth 1959). Both of the aqueducts consisted of an open channel

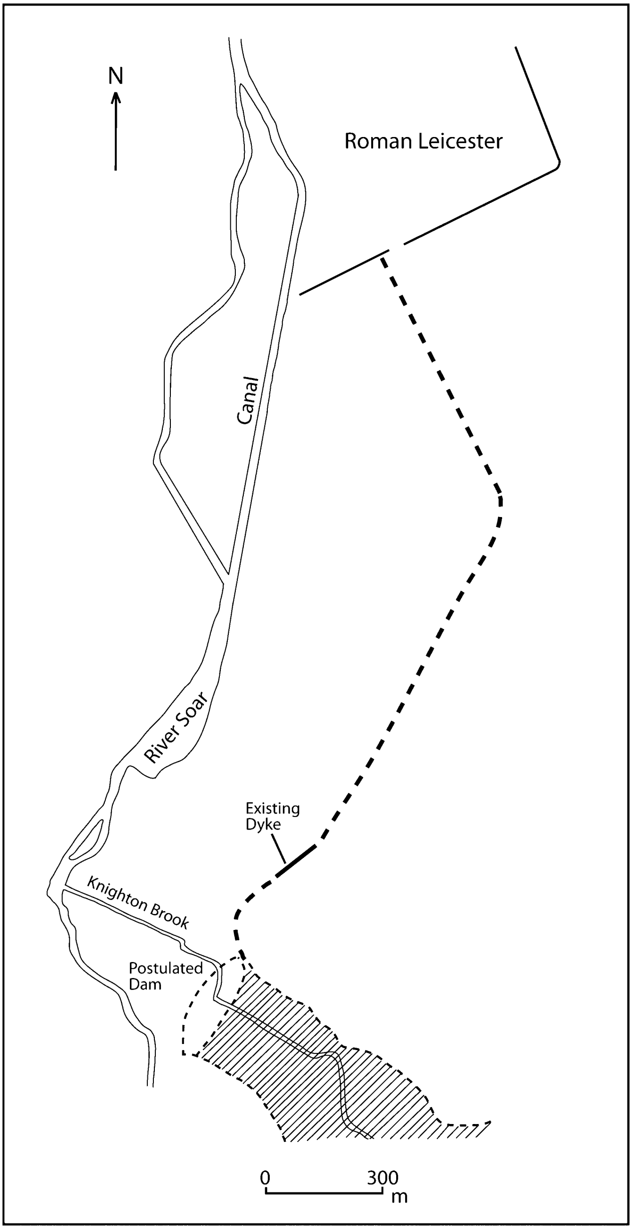

Figure 3.10. Plan of the existing and possible course of the aqueduct at Leicester (drawn by A.C. Rogers; adapted from Wacher 1995, figure 158)

Figure 3.11. Photograph of the existing section of the 'Raw Dyke' at Leicester which formed part of the aqueduct (photograph taken by A.C. Rogers)

fed by streams running into the town along a natural contour. At Wroxeter a possible dam and reservoir to supply the aqueduct has been identified to the north of the town (Ellis 2006: 161; Pocock 1933–1934). The Dorchester aqueduct was fed by the Steppes Bottom Stream (Putnam 2007: 61).

At Winchester, despite the town being located in the floodplain of the Itchen, which has often been argued to relate to ease of water supply (Zant 1993), it appears that water was also brought to the settlement by an aqueduct. Excavations to the north of the town at Graces Farm, Itchen Valley Parish, identified a 70 m long linear feature running along the contour of the Itchen Valley. Five sections were excavated to reveal a feature with a width of 2.00–2.70 m with steep or almost vertical sides and a general depth of around 0.65 m (Fasham and Whinney 1991: 5; Qualmann 1991: 10–11). Further traces of this possible aqueduct were identified in the more recent Northgate House excavations where a channel with a concave profile 2.5 m wide and lined with a hard flint mortar surface was found. Whether it had originally been covered in some way was not possible to tell but it seems that it may have

been too substantial to have been a simple street-side drain and it may have served to take water from the aqueduct that entered the town in this area (Ford et al. 2011: 185). Despite not having stone superstructures, then, these aqueducts were monumental constructions in their own right (cf. Burgers 2001: 144–146) and suggest considerable knowledge and ability to control water.

Wilson's (2000a: 152) useful study of methods of drainage in the Roman period has grouped urban drainage systems into a number of categories including the drains within a building or complex collecting water at a point of entry to the drainage system or leading away from a place of use such as channels from latrines or baths or gutter spouts from roofs. Then there are canalisations under streets joining buildings and also large drains collecting water from whole areas or towns. The nature of the drainage within a town could depend on the age of the settlement with new foundations able to install underground drainage systems which was more difficult on settlements with a long sequence of use (ibid.: 169). Without similar evidence from Iron Age sites, the removal of water via linear drains over long distances is likely to have been a relatively new phenomenon in Roman Britain and they perhaps represent different attitudes towards water control and waste. Some monumental sewers in the form of underground conduits are known, such as the Church Street sewer in the fortress at York (Whitwell 1976). Here there was a main channel 44 m long with six side passages running into it; five other channels were connected with the main channel (ibid.). Not all towns had sewers and it is important that we do not apply modern attitudes to urban sanitation to the Roman period.

Burgers (2001) has provided a good summary of much of the known evidence of water-pipes and drains in Roman Britain. Water-pipes indicate the presence of water that was probably brought into the settlement by an aqueduct rather than being drawn from wells. Lead and ceramic pipes are known, but wooden pipes joined by iron collars were the most common and they are found at a number of towns including Caistor-by-Norwich (W. Bowden pers. comm.), Colchester (Crummy 1984), London (Williams 2003), Verulamium (Niblett 2005: 87) and Wroxeter (White and Barker 2002: 100). Examples of lead pipes are known at London (Williams 2003: 245) and Wroxeter (Atkinson 1942) although lead is much more likely to have been robbed in antiquity. Ceramic pipes have also been found including in Southwark (Cowan et al. 2009: 77), Chichester (I. Schivener-Lindley pers. comm.) and Lincoln (M. Jones 1988: 159). The reasons behind the choices taken in the use of material are uncertain but wood would have been cheaper than lead and ceramics (Burgers 2001: 11) and so would probably

have been more suitable for larger-scale and longer distance needs whilst other materials were perhaps used when shorter pipes were needed.

Fountains not only had practical functions in distributing water but they could be sources of civic pride, monumental structures, as well as foci for local communities (Longfellow 2011; Rinne 2010). As outlets of water they were important reminders of the urban involvement in, and command of, the waterscape whilst also providing foci of social interaction and local senses of place and belonging. The presence of *nymphaea*, however, also indicate the religious associations attached to these water sources which also formed a part of town life; Longfellow's (2011) study of civic patronage has argued that *nymphaea* were often further elaborated by successive Roman Emperors in order to demonstrate their interest and authority in distant parts of the Empire. Ellis (1997) has also argued that drawing on water from springs and lakes may well also have had religious implications.

There are some remains of what were probably fountains in the context of towns in Roman Britain although rarely excavated under modern conditions including at Leicester (Wacher 1995: 352) and Wroxeter (White and Barker 2002: 100). At York in 1906 a stone fountain was found at Bishopshill consisting of a tank about 1.15 m^2 and 1.00 m high (Ottaway 2004: 116). At Lincoln an octagonal stone fountain was first found in 1830 in the area of the Lower City and it was investigated again in 1953. It was a limestone structure around 6 m in diameter and around 1 m high with a floor of opus signinum. The part of the channel for the outlet pipe was also found and it was probably fed from uphill by an aqueduct (Jones 2003: 90). A water tank around 16 m long, used to store water from an aqueduct, was also found in Lincoln to the rear of the city wall (Jones 2003: 61). At London what appear to have been ornamental fountains were found in association with the problematic Cannon Street building complex (Marsden 1975). At Verulamium, the structure interpreted as a *macellum* had an elaborate water supply system and there was a vaulted masonry conduit that brought water from the river Ver to the point south of the *macellum* where there may have been a public fountain (Niblett 2005: 86). Reconstructions of the building, moreover, suggest that there may have been a niche for a statue, indicating that the building possibly had a *nymphaeum* (ibid.).

Watermills and other forms of waterpower can also be considered in terms of controlling and organising water and they were often fed by canalised channels. Recent studies of watermills (e.g. Kamash 2006; Leveau 1996; Ö. Wikander 2000b; Wilson 2000b; 2002) have been placing more emphasis on their importance and they have argued that the recognition and investigation of water-powered installations in Roman archaeology has suffered because of

past reconstructions of the Roman economy that emphasised technological stagnation and little innovation or economic progress (e.g. Finley 1973). This, along with few textual references to watermills in the classical sources, has encouraged the view that they did not really become important until the early medieval period. Spain (1984) has also made the important point that the forces that drove watermills would also have been capable of causing considerable destruction to land over the long term and so many examples of watermills could well have been lost. Whilst Wilson (2002) and others have been keen to emphasise and document the importance of water powered machinery in the Roman economy it could also be argued that an important aspect of watermills is their requirement to channel and manipulate water in artificial contexts.

In Britain there is some evidence of watermills in the Roman period and evidence is increasing (Spain 1984; Watts 2000). Spain's (1984) work on watermills in Roman Britain has analysed the known examples from military and rural contexts but there are now some examples that have been identified within urban contexts. On the mechanics of watermills, the structures can be divided into those with a horizontal wheel where the millstone is mounted on the same shaft as the wheel and is fairly feeble in power; then there were vertical wheels which required more water but were also more powerful (Lewis 1997: 1). In Britain probably the first watermill was recognised archaeologically in the 1860s along the River North Tyne during the excavations of Chesters fort (Spain 1984: 103). Other watermills have since been recognised or suspected at Haltwhistle Burn Head and Willingford Bridge in military contexts and in rural contexts at Fullerton, Hampshire, Nettleton in Wiltshire and Ickham in Kent suggesting that there were official establishments, private enterprises and mills belonging to domestic structures (see Bennett et al. 2010; Spain 1984). This raises the possibility that there might have been a relatively large number of watermills in Roman Britain including in urban contexts. Bennett's (2010) study of the rivers of east Kent alone in the Roman period indicated that a large number of rivers had rates of flow capable of powering a watermill in the Roman period and most were indeed used for watermills from the early medieval period onwards. The only evidence so far known, however, of Roman period mill activity here comes from Ickham. The Ickham site (mid-way between Canterbury and Richborough) by the side of the Little Great Stour revealed a sequence of mills continuing into the fourth and possibly fifth century AD where metalworking (including lead, pewter, copper and iron), woodworking, tanning and flax-processing took place (Bennett et al. 2010). It is unfortunate that our knowledge of the site is mainly from rescue excavations during

quarrying in the 1970s. The presence of military metalwork at the site led to some suggestion that the site was under the control of the army, but this material may solely have been used as scrap for recycling. Instead the site may have been a private venture owned by the landowner or a group of landowners.

Recent work on a site to the southeast of Verulamium overlooking the River Ver has made some discoveries that have been interpreted as a possible watermill. These include part of a substantial masonry building, first uncovered in the 1960s (Niblett 2005: 124), on footings more than 1 m wide (Anon 2010). It appeared to have been situated just beyond the alluvium which demarcates the extent of the floodplain. What suggests that this building may have been a mill rather than anything else was a large ditch that was identified in association with the building containing Roman pottery dating from the late first to fourth centuries AD (ibid.). Without further evidence for the workings of the building, this ditch may have been a leat for a watermill, but this can only be speculation at this stage. Millstones, like querns, have also been found in non-working contexts such as when they had been incorporated into hearths and floors of buildings (Watts 2000: 10). This could be interpreted as the opportunistic reuse of stone but it is likely that the grinding of grain, part of the agricultural cycle, would also have had symbolic connotations with growth, productivity and rebirth (cf. Scott 1991). The millstones and querns may well have been ritually incorporated into buildings because of the meanings associated with them.

In London, the location of a watermill has been suggested at Bucklersbury House in the Middle Walbrook Valley where three millstones of German lava were found (Marsden 1980: 72; Milne 1995: 64). Excavations here in the 1950s also suggested that the river appeared to narrow here perhaps indicating that the water was being deliberately channelled for use (Grimes 1968: 93). No evidence of the superstructure of the mill was found but excavations further upstream have also suggested that there may have been a watermill in this Middle Walbrook Valley area as this may be what created the blockage in the river flow which caused the river to backup and flood in the Upper Walbrook Valley; a fact observed on upstream sites in the late second and third centuries (Blurton 1977: 20–21; Maloney 1990: 123).

Excavations in the lower valley of the River Fleet at London identified what may have been the remains of a tide-mill on the more northerly of the two eyots within the estuary (Hunting 1993: 12; Spain n.d.). On the island were the remains of a substantial building constructed in the early second century along with deposits of charred spelt wheat, chaff and possibly barley

suggestive of milling operations. Little is known about the building or how it may have functioned but its position within the upper tidal basin of the Fleet raised the possibility of a tidal mill (Spain n.d.). Harnessing the tides and impounding the estuary in this way would have been monumental acts of landscape transformation.

At Canterbury it has been argued that there was a watermill at the St Mildred's Tannery site where the excavated remains of a building appeared to have been associated with an inlet from the Stour which may have been used to power a watermill here (Pratt and Sweetinburgh 2004: 11). Whilst this seems possible, there is very little other evidence surviving on the site to support the interpretation which is based mainly on the location and the presence of structural remains. No other cases of urban watermills are known in Britain but the large number of recorded mills in towns in the medieval period such as Canterbury (Lyle 2008), Chichester (R. Morgan 1992), Cirencester (Gerrard 1994), Gloucester (Fullbrook-Leggatt 1952) and Colchester (Cooper 1994) suggest that watermills could well have operated at these places in the Roman period as well. Roman millstones are known in local museums, as at Dorchester and Chichester for example, which may indicate that watermills that once existed in or near these places but excavations are needed to find further mill sites and provide possible contexts for these millstones. They may well also have redirected streams and created new watercourses in some cases.

Bathhouses have, of course, been the subject of considerable scholarly attention within Roman studies and there are a number of specialist publications on the subject of baths and bathing (e.g. DeLaine and Johnston 1999 eds.; Fagan 1999; Yegül 1992). What is especially worth noting here is that bathhouses have conventionally been used as an equivalent to identifying Roman civilisation that was brought to conquered provinces and they have been central to notions of 'Romanisation' (e.g. Haverfield 1912; Wacher 1995).[3] Bathhouses were associated with water's role in providing hygiene, cleanliness and purity (Kamash 2010), which could take on a ritual significance. They are often found in temple complexes indicating that they formed a part of the religious proceedings; well known examples include the temple at Bath (Cunliffe and Davenport 1985) and the sanctuary sites at Lydney in Gloucestershire (Woodward 1992: 49, 77) and Sanxay in France (Aupert

3 In the United States of America, Dyson (2001) has shown how public architecture took on the form of Roman buildings including bathhouses as a symbol of their own power and civilisation; an example being New York City's Pennsylvania Station which was based on the Baths of Caracalla.

1992). Pre-existing attitudes to water and water use in Britain must also be taken into account in the way in which these structures were regarded and accepted amongst local communities. Artificial water routes in the form of supply channels, aqueducts and drains, for various functions, would have formed an important element of townscapes in addition to the rivers, streams and other watery contexts in the urban setting.

CHAPTER FOUR

WATERFRONTS: THE LAND/WATER INTERFACE AND THE CONSTRUCTION OF WATERFRONT INSTALLATIONS

Waterfronts are significant components of waterscapes: they are the interface between water and land and points of access from land to water and vice versa. They are found wherever water meets land and can include riverbanks, shorelines and the edges of lakes and ponds. They can be of considerable practical and economic value for accessing the water and its resources but also of social significance and value as locations of activity. One major way in which waterscapes were used, acted upon, experienced and altered by human action in the past, and of course continues today, was in the use of waterfronts and the construction of harbours, ports and other artificial waterfront structures. These installations can be found in the context of urban settlement in association with rivers and lakes as well as at coastal locations. The subject of ports and harbours in the Roman period has long been an important area of study and there is a vast amount of literature looking at specific installations as well as more general surveys of different periods and their development over time (e.g. Blackman 1982a; 1982b; 2008a; Gébera and Morhange 2010; Hurst 1994; Keay et al. 2005; Keay and Paroli 2011; Lehmann-Hartleben 1923; Oleson and Hohlfelder 2011; Reddé 1986; Rickman 1988). The focus of most studies, however, has been on the economic or military role of ports and harbours and the technology of construction and though these themes are of essential importance, a more neglected aspect, has been the social implications of waterfront installations and the way in which they formed an integral part of the relationship between urban space and water.

The purpose of this chapter is to examine the way in which waterfronts formed socialised components of waterscapes in the urban context and how they were altered and experienced through human action, including the construction of installations, as town spaces developed. The material can be used to examine issues connected with the relationship between land and water in the urban context, the experience of the waterfront environment, the increasing manipulation of waterscapes and the social significance of construction activities relating to waterfronts, especially in terms of local

expressions of identity and the human relationship to place. There are important theoretical approaches that can be taken from the specialist area of maritime archaeology, not usually considered in Roman studies, which can be used to help us in the analysis of this component of the urban waterscapes.

Waterfronts and Maritime Archaeology

The 1980s saw the appearance of a number of key publications advocating the importance of urban waterfront archaeology and highlighting the lack of study of waterfronts in urban archaeology compared with the large number of studies of coastal ports and harbours in maritime archaeology. Urban archaeology tended to remain separated from the interests of maritime archaeologists and so waterfronts were neglected. Concentrating mainly on medieval and post-medieval archaeology, these new publications emphasised the widespread occurrence of artificial change to waterscapes in the urban setting through the construction of ports and harbours and highlighted the fact that alterations to waterfronts were of major topographical importance and of need of detailed study (Good et al. 1991; Hobley 1981; Milne 1981; 1987; Milne and Hobley eds. 1981a). In a 1987 article Milne discussed the increasing understanding of urban waterfront development in the medieval period but also drew attention to the lack of comparable knowledge of artificial waterfront change in the Roman urban context. Writing of urbanism in the medieval period, Milne (1981: 33–34) identified four motives behind waterfront alteration at either coastal or riparian towns: i) the desire to win land for its own sake and to be utilised as building space—this is also what Clarke (1973) suggested in her important study of the development of the medieval waterfront at King's Lynn; ii) the need to create or maintain a harbour capable of accommodating deep-draught shipping at ports and could consist of extensions over shelving beach to create a frontage; iii) to prevent harbours becoming choked with silt; or iv) to maintain a sound frontage against the erosive action of the water.

This list alone indicates the huge potential there is in studying the motives behind waterfront alteration for understanding developments in urban space. The importance of waterfront studies has tended to be directed towards economic issues especially for examining trade. Hobley (1981: 1), for example, stated that waterfront investigation must be an "integral part of urban research since so many early towns were also ports" and that "waterfront development is an economic indicator not only for the town itself

but in many cases for the hinterland also". In the introduction to their seminal volume on waterfront archaeology, Milne and Hobley (1981b: v) stated that "almost any definition of a town must refer to the importance of trade, but archaeologists have only recently attempted to study the development of riparian and coastal towns by examining the major trade outlet itself, the waterfront". It is also important to address the social implications of altering the relationship between land and water in these contexts and the experience of the waterfront environment within towns.

Maritime archaeology is an important specialism that focuses on archaeological material related to water including shipwrecks, cargoes, waterfront installations and other structures. Research perspectives have changed considerably over the last twenty years or so; whereas in the past it could be criticised for not embracing the theoretical developments taking place in other areas of archaeology, it is now theoretically aware and developing important frameworks of analysis, although there do also remain some more conventional studies. Especially problematic can be its descriptive approach to material and its likeness to treasure hunting through its study of shipwrecks and cargoes with little consideration of the social context of the finds (cf. Dellino-Musgrave 2006). There is now, however, much more social analysis and contextualisation of the material but these developments have so far had little impact on the study of Roman period port and harbour installations. Rather than falling within the developments of maritime archaeology, the study of Roman ports and harbours which has tended to be undertaken within the same traditions and methodological frameworks as Roman settlement archaeology. Maritime archaeology, therefore, potentially has much to offer the development of theoretical approaches in Roman port studies. At the same time, focusing on the cultural specifics of the Roman period avoids the problem of maritime archaeology that can come from broad cross-period studies that assume that the material in all periods can be interpreted and understood in the same way. The multi-period nature of the specialism can create difficulties if it is assumed that ports, harbours and other installations were associated with the same cultural meanings in successive periods. It is also important to be careful when we apply modern assumptions onto the way in which these structures were understood and experienced in the past and emphasis is needed on the cultural specifics of each find and context including both non-Western perspectives and pre-modern periods of the Western past.

Keith Muckelroy's (1978) book *Maritime Archaeology* was perhaps one of the first major proponents of a new approach to maritime remains and it has been a highly influential text in the field. Muckelroy (1978: 4) stated that

the "primary object of study is man and not the ships, cargoes, fittings, or instruments with which the researcher is immediately confronted". He also argued that archaeology "is not the study of objects simply for themselves, but rather for the insight that they give into the people who made or used them" (ibid.). A useful resource which pulls together a huge range of writings on maritime archaeology is Lawrence Babits and Hans Van Tilburg's (1998 eds.) *Maritime Archaeology: A Reader of Substantive and Theoretical Contributions*. This volume contains a valuable selection of writings demonstrating the development of the discipline and assesses the state of research in different parts of the world. It is unfortunate that it misses the opportunity to deal with the archaeology of port and harbour studies in much detail and instead focusing on ships and shipwrecks. A more recent book is the *Oxford Handbook of Maritime Archaeology* (Catsambis et al. eds. 2011) presenting new research and current thinking on many subjects including ship and shipwreck archaeology, the process of studying maritime archaeology and ethics, politics and museum archaeology. The section entitled 'Maritime Culture and Life Ashore' is perhaps the most relevant here but the chapter on ports and harbours in antiquity focuses on the Mediterranean (Oleson and Hohlfelder 2011) and takes a more conventional narrative and descriptive approach. Other chapters, however, attempt to take different approaches by emphasising human behaviour in waterfront contexts and exploring non-Western perspectives and traditions such as Ransley's (2011) paper 'Maritime Communities and Traditions'.

Perhaps the most significant proponent in developing a more holistic approach to understanding archaeological material connected with water is Christer Westerdahl and his concept of the 'maritime cultural landscape'. Through this concept his work over a number of decades has been emphasising the importance of considering human actions and experiences within the spatial context of maritime locations including both landscape features and artificial constructions. This differs from the concept of 'seascape' which describes the landscape viewed from the sea which includes elements such as islands, reefs, shallows, seamarks, lighthouses and harbours (e.g. McNiven 2003). Elements within the maritime cultural landscape are used to explore how people used and perceived the sea and used this knowledge and understanding to order and constitute the landscape and societies they lived in (Ford 2011: 5; O'Sullivan and Breen 2007).

Westerdahl (2011) himself has described the way in which the concept of the maritime cultural landscape has developed since the 1960s and 1970s he acknowledges earlier influences from work on 'cultural landscapes' by geographers and ethnologists. In the 1960s Westerdahl carried out interviews

with maritime people, including fishers, pilots, lighthouse attendants, divers and coastal people, at Lake Vänern in Sweden and by the 1970s and 1980s was writing about 'Det maritima kulturlandskapet'. This came to mean the study of cultures that were conceptually different from inland agriculturally-based cultures but it has since then also come to refer to the study of social interpretations of all elements connected with coastal or waterfront settings and human experiences associated with them. It also tends to refer to holistic approaches to coastal landscapes both spatially and chronologically. More emphasis on the cultural values of coastlines comes with *The Archaeology of Maritime Landscapes* (Ford ed. 2011) which takes archaeological and landscape approaches to examining the way in which coastal locations were used and experienced.

Two further recent publications Paul Rainbird's *The Archaeology of Islands* (2007) and Robert Van de Noort's (2011) *North Sea Archaeologies* provide innovative approaches to studying maritime cultures. Robert Van de Noort's book *North Sea Archaeologies*, as the title indicates, focuses on just one area the North Sea and takes a broad chronological approach from 10,000 BC to AD 1500. This is a long time span and considers the way in which cultures on both side of the channel have interacted with, been influenced by, and acculturated the sea and coastline and focuses extensively on seafaring and boat technology. It is unfortunate, then, that although the book spans such a long period, there is comparatively little discussion of Roman period waterfront infrastructures; it is almost as if the Roman period continues to be regarded as unproblematic as does not fit into the theoretical framework for the rest of the book.

It is important that a social approach becomes part of Roman port and harbour studies. One reason for there not having been much consideration of theoretical issues in the investigation and interpretation of port and harbour archaeology is perhaps the fact that ports and harbours are still important features in the modern world. They are regarded as recognisable entities and ones that we can relate to easily today. Drawing on modern parallels, our understanding of port and harbour archaeology is projected into the past when we attempt to consider meanings associated with archaeological structures and their uses. It is important, however, that we theorise port and harbour archaeology like any other aspect of the material record to help with our interpretation and understanding of the findings. The fact that installations, especially timber structures, and objects can often survive well in wet conditions can also encourage descriptive approaches and lead to the assumption that they are unproblematic and simple to recognise and interpret without contextualising them (cf. Flatman 2003; Westerdahl 1992; 1994).

The terms that we use to describe the installations can also be influential in the way we study waterfront installations. Cleere (1978: 36) and Jones (2009: 48) have raised the issue that in modern English usage there is considerable inter-changeability between various terms such as port and harbour, wharf and jetty when in fact they have significant differences. McGrail (1997: 49) has emphasised the fact that assumptions are often made about the recognition of a structure based on the interpreter's awareness of possibilities and on insight and reasoning. Ethnography can assist in helping archaeologists to go beyond the bounds of their own culture and to become aware of technologies other than those associated with the modern West. Usefully, McGrail (1997: 49–63) provides a number of definitions of features demonstrating the differences in purpose of the various structures from landing places, which can to some extent be formalised and made permanent through use over time, and 'hards' through to causeways, wharfs and jetties and other structural features. 'Hards' consist of hardstandings of hurdles or poles and other light timbers in order to prevent the hull of a ship sinking into the mud when landed on soft beaches. Causeways are linear structures slightly raised above their surroundings and used to cross wet or marshy ground and constructed of wood or stone or hard packed and consolidated sand or gravel. According to McGrail, a wharf may be defined as "a stone structure, or a wooden one supported on piles, alongside which vessels can lie". A jetty "is similarly constructed but it projects at right angles from the shoreline or from a wharf" (1997: 54).

The distinction between harbour and port, in the modern use of the terms, is perhaps most often overlooked. The Oxford English Dictionary (1989) which describes a harbour as a place where vessels can be stored or seek shelter. They can be artificial, constructed with breakwaters, sea walls or jetties, or they can be natural, surrounded by prominences of land. A port, on the other hand, is an artificial construction on the sea, lake or river shore where vessels are loaded and unloaded.[1] These functional definitions are useful but it is important not to rely on the apparent familiarity of these structures without assessing their impact on local places and people. It is important to consider waterfront archaeology

[1] This is similar to Hobley's (1981: 9) definitions where a port is "a town (or place) possessing a harbour to which vessels resort to load or unload, from which they start or finish their voyages; and a harbour is a place for shelter for ships, especially where they may lie close to and sheltered by the shore or by works extended from it. A waterfront area in which goods and passengers were regularly transferred from ship to shore, and vice versa".

through theoretical frameworks in order to address the social impact of the change to waterscapes through the construction of waterfront installations.

The fact that we have textual sources relating to port and harbour installations in the Classical World may have influenced the way in which they have been studied with the assumption that they are unproblematic. There are ancient textual sources that describe either methods of construction or individual ports in various levels of detail. The earliest known book, though itself lost, which could be described as a construction manual is the work by the engineer Philo of Byzantium known as *Limenopoiïka* (*Harbour Construction*) written in the late-third century BC. Though it cannot now be consulted, the existence of this text is important because it demonstrates that by the Hellenistic period in the Mediterranean there was regarded to be a science in port and harbour construction indicating developing attitudes to the way in which the land could be treated and altered; there was a growing command of the land and seascape. This does not mean, however, that we can read and understand these ancient manuals in the same way as modern ones which were written in entirely different contexts and writing traditions. The motives and perspectives of the authors will also have been significant influencing factors in the style of writing and the contexts described, included and excluded in the books. This fact can be seen in Frontinus' *De aquae ductu urbis Romae* and Vitruvius' *De architectura* where there is much debate about the nature of the construction of these works and from where the information was gathered (e.g. Blackman and Hodge 2001; McEwen 2003).

Vitruvius' *De architectura* drew on the existing bodies of evidence for his writing on harbour construction in the first century BC as well as probably his own experiences. Chapter (V.12) describes harbour, breakwater and shipyard construction but it is more a description of processes than a step-by-step guide that could be followed. Vitruvius himself wrote that the book contained all that he "could remember as necessary for general use" rather than it intending to be a comprehensive guide. His description of pozzolanic sand (II.6), and how it is used for hydraulic concrete, is also more anecdotal than guidelines that could be followed for making the concrete. The preface to Book I gives some indication as to the context in which the work was written and the intention behind it, namely a celebration of Augustus' rise to power and "acquiring the right to rule the world". The treatise was a celebration of his power and the fact that it drew on earlier Greek architectural manuals, and comparing throughout with the achievements of Greeks or others, Vitruvius was perhaps establishing Roman efforts and accumulated knowledge here as superior and dominant (cf. Cuomo 2008: 24). Vitruvius played a hugely

important role in the Renaissance revival in classical design and urban planning as can be seen in such treatises as Leon Battista Alberti's (1404–1472) 1452 work *De re aedificatoria* (trans. Rykwert et al. 1999; cf. Goalen 1995: 185). Drawing on such works in this way, but writing in a different social and political context, will have influenced the way in which the Roman period documents themselves were interpreted and in turn how archaeologists in later years have examined and attempted to understand archaeological features. The post-medieval and later reception of these texts will have influenced the way in which we study the archaeological remains of the period.

As well as technical manuals there are also descriptions of ports and harbours in a huge range of other types of texts where they can form central components of descriptions or instead form background elements to other events or purposes. The first century AD. Roman-Jewish historian Josephus, for example, in his works *Bellum Judaicum* (I.408–414) and *Antiquitates Judaicae* (XV.331–341) provides descriptions of the harbour at Sebastos (*Caesarea Maritima*), the manner of construction and its final appearance. None of these will have been written without personal bias and motive but they can provide useful insights into the actual period and how this might relate to archaeological remains. Textual sources can also provide indications of the people and activities at ports which archaeological material alone cannot always easily provide. Modern readings of these texts, however, will always be influenced by current social perspectives which must be borne in mind when we use them to understand archaeological evidence. It can also not be assumed that the authors can represent viewpoints that apply across the Roman Empire. It is important to acknowledge local contextual meanings and the localised significance of the construction activities and the meanings attached to each installation.

Waterfront Installations and Identity

Studying the technological aspects of installations is an important and specialised element of port and harbour archaeology but there is a tendency to rely on interpretative frameworks for how they were experienced based on modern concerns and viewpoints. We tend to convert, or translate, archaeological evidence into something that we can understand and assume that it was essentially the same in the past (cf. Shanks and Tilley 1987: 115–117). Ports and harbours, like other forms of structures and artefacts, however, have a materiality—they can be considered in terms of material culture—and as

such they were "actively and meaningfully constituted" (Hodder 1993: xvii). They were produced by human agents and will have had specific contextual meanings as well as invoking a multitude of responses by those viewing, using and experiencing the structures. They will have had 'biographies' resulting from their manufacture, interpretation and use (cf. Appadurai 1986; Gosden and Marshall 1999; Kopytoff 1986). As such, they will have had a relationship with people, acting on them as people acted on structures and objects.

Architecture not only creates space for practice but is also itself meaningfully constituted through construction processes and human decision-making. Architecture expresses ideas about the self and being in the world and waterfront installations represent statements of purpose in their interaction with the landscape. Construction technologies themselves are an important aspect of architecture as material culture with the choice of materials and methods resulting from different motives, world views and desired outcomes (Dobres 2000; Gardner 2007: 179; Revell 2009). Through examining the construction and use of waterfronts we can also explore the active involvement or 'agency' of the people involved as well as their relationship with the wider world (cf. Giddens 1984). Waterfront installations can also be examined in terms of deliberate alterations to the waterscape in which they were set which would have provoked a variety of responses amongst the people involved and the observers. Waterfronts were spaces where connections were made between people, materials and water. Through these building activities, people were interacting with earth, water and the building materials. The practice of building connects people to the world and these events may even have been more memorable than the finished structures (cf. McFadyen 2006). Waterfront installations will also have been meaningful through human involvement in construction, the process of interacting with water, altering the relationship between water and land as well as the practical difficulties of the task. Waterfront construction relates to the identities of the people involved in the building activities but also more general attitudes to treatment of the land. They were also related to human movement and the way in which waterfront activities were organised.

Developing Port and Harbour Technology

In two recent summaries of current knowledge of the development of ancient port and harbour technology there is a clear emphasis on economic perspectives. Oleson and Hohlfelder (2011: 810), for example, state that the "symbiotic feedback between the economy and technology is especially marked in the history of harbour construction". They go into more detail that

"the evolution of harbour design was driven by the changing characteristics of the ships that used the facilities, the economic needs of the individuals and groups that constructed them, and changes in available tools and techniques". Blackman (2008a) also placed an emphasis on the economy describing the increase in commerce and the size of boats which meant that it was necessary to berth them by the side of quays rather than landing them on beaches. Both articles agree that the earliest major artificial waterfronts were probably constructed in the riverine civilisations of the Indus Valley, Egypt and Mesopotamia where there were increasingly large ships involved in the movement of materials and goods. At Lothal, an Harappan site of the late third millennium BC, there were remains of a rectangular basin close to the city walls lined with fired mudbricks and bitumen. There were also channels connecting the basin to the Sabamati River and Indian Ocean (cf. Blackman 1982a: 92). Similar types of constructions then appeared in Mesopotamia and Egypt. In the Bronze Age Mediterranean some harbours were shaped by quarrying, such as at Tyre, Sidon and Aradus, but the majority consisted of naturally sheltered beaches and bays.

Our understanding of Bronze Age harbours is affected by the fact that in many cases natural locations were used and no or little construction activity took place. In other cases the artificial installations have been lost due to later activity, coastal erosion and other factors (Blue 1997). It is important to recognise, however, that 'natural' harbours are also important socialised entities and cannot be regarded as natural (uninfluenced by human behaviour) even if no construction takes place at all. They can also, then, be studied from a range of social perspectives including the way in which they were experienced and negotiated through human action. At the end of the Bronze Age it is again trade that is seen as the main cause of the development of ports and harbours and this relates especially to the Phoenicians and Greeks. There have now been a huge number of publications on Phoenician and Greek colonisation and it is not necessary to go into this in any detail here simply that this is important because it places an emphasis on the economy and colonisation and not on the social implications that accompanied them (cf. Dietler 2010). The Phoenicians appear to have pioneered the construction of breakwaters built by placing blocks of rock on gravel foundations (Oleson and Hohlfelder 2011: 813).

The island of Samos is where traces of the earliest known harbour works in the Aegean are known and there are also textual sources which provide some background to their construction. Herodotus (III.60.3) describes that it was Polycrates the tyrant ruler of Samos that constructed the installations here. These structures included a long rubble-mound breakwater built of

marble blocks, many of which were reused when the present-day quay was built in the 1860s. Herodotus (III.39; III.44–45) also mentioned that there were shipsheds built around 530 BC but so far no definite archaeological remains have been found relating to these. Oleson and Hohlfelder (2011: 813) make the point that it was only a commercially successful tyrant that could have afforded such expenditure for these structures. Though this was perhaps the case it again places emphasis on economic interpretations of the constructions which may only have been part of the story. Shipley's (1987) analysis of the history of Samos and the succession of tyrants makes it clear that a significant importance was placed on the individual tyrant who would have expressed their power and identity through what they were doing and constructing. Through these constructions in the sea, Polycrates was perhaps making a major statement of power and permanence in what must have been a fairly precarious position.

The earliest known major installation built using hydraulic concrete is at the harbour of Cosa on the coast of Etruria probably built in the mid-first century BC (McCann 1987; Oleson et al. 2004); the technology itself seems to have developed around 200 BC. The use of concrete meant that waterfront installations did not now only have to be built where there was a natural harbour (Blackman 2008a: 645). Pozzolanic sand to the mortar allows it to set underwater out of contact with atmospheric carbon dioxide (Oleson and Hohlfelder 2011: 817). It allowed free-standing structures to be built in the sea instead of using stone blocks. The use of hydraulic concrete across the Mediterranean has been the subject of detailed investigation in the Roman Maritime Concrete Study (ROMACONS) which has been taking samples of hydraulic concrete from a range of sites in order to define its structural characteristics, production methods and history of use including how the technology spread (ibid.; Oleson et al. 2006). Hydraulic concrete was used on a major scale at the harbour of Sebastos at Caesarea Maritima initiated by Herod around 22 BC which has been the subject of considerable investigation. Studies of the waterfront structures here were able to elucidate aspects of the vast scale of the undertaking with the importing of 1000s of tons of raw material including pozzolanic sand from the Bay of Naples around 2000 km to the west. Despite there being texts describing the construction of the harbour and its appearance, such as by Josephus, the scale of the quantity of the imported materials was not previously suspected. Studies such as this can be of immense value in advancing our understanding of technological factors but it also ties into social implications.

Raban (2009: 52–53) has analysed the role of Sebastos in the grain trade and demonstrated the way in which the meanings associated with this

monumental harbour construction were intertwined with economic and symbolic factors. He has argued that Sebastos developed in a strategic location to exploit the grain trade. The grain carriers travelled mainly in the period between April and October and they often needed places to stop-over for supplies or even to winter. The constructions at Sebastos were large enough for the largest grain carrier to moor and the fact that the storage facilities were on the main moles rather than at its land side suggests that the transit trade played a major role in its operation (2009: 53). Raban has suggested that Sebastos was located at the extreme north of Herod's territory in order to compete with Alexandria over the economic benefits of having grain carriers stopping or wintering there. The merchants could also benefit through gaining higher profits as Rome would have been desperate for grain by the spring. Herod also used the port for the export of products from the hinterland of the city including olive oil, wine and dried fruits (ibid.: 49). Raban emphasises that Sebastos should be seen as part of Herod's continued desire to gain control over trade routes and this, as well as the wealth that could be gained from it, is reflected in the monumentality of the harbour constructions. This harbour was as much about political power, wealth and control of sea and land as any practical necessity.

It is also easy to consider the sourcing of natural materials and the creation of the concrete in purely practical terms but there may well have been other social meanings associated with the source and processes involved. The origins of hydraulic concrete appear to have been in the Bay of Naples where the volcanic ash additive was used (pozzalana) probably in the late-third or early-second century BC (Blackman 2008a: 644). Writers including Strabo (V.4.6) and Vitruvius (II.6) record the importance of the sand from this vicinity: "it is found in the neighbourhood of Baiae and in the country belonging to the towns round above Mount Vesuvius" (Vitr. *De arch*. II.6). It does not appear until the second or third centuries AD that engineers understood that virtually any ash would do including that from the Rhineland (Oleson and Branton 1992: 57). This took on a different appearance from the central Italian material and it is important to recognise that the different sources and appearances may have had cultural meanings and actions cannot be reduced down solely to technological considerations. It is possible that the Mount Vesuvius material was associated with myths and stories linked with the wider landscape and histories of this location. It may as a consequence also have been regarded as possessing special properties and powers which made it impossible to consider that other sources of material would function in a similar way. The colour of the material may also potentially have been regarded as just as significant as other characteristics. The use of in these

materials, then, cannot be reduced merely to economics and practicality and we can also look at the meanings associated with the construction of installations in other contexts.

Riverfront Structural Biographies

In addressing the subject of waterfront installations in Roman Britain at the end of the 1970s, Boon (1978: 2) stated that "little is known of Roman ports in this country" (see also Fryer 1973 and Cleere 1978). This position has now changed considerably in that more data is available but the subject area has remained largely isolated from broader issues and theoretical developments in Roman archaeology. A recent publication on the subject *The Maritime and Riverine Landscape of the West of Roman Britain* (J. Jones 2009) provides a useful survey of current knowledge of ports and harbours, principally in the West of Britain, but concentrates mainly on the themes of transport and trade. In urban contexts there is evidence of both waterfront structures built in stone and in timber and the known material is described in some detail here. Whilst stone was a more permanent substance, timber structures could be monumental in their own right. Rather than focusing on the structures themselves, however, the purpose here is to place more emphasis on the social significance of the architecture of waterfronts, its materiality and its context in terms of waterscape use and transformation in the urban setting.

At Gloucester there is evidence of a stone-built waterfront along the old course of the Severn. On a number of sites where the waterfront had been identified, the masonry had apparently been robbed out (as at Claire Street and 10 Lower Quay Street) but excavations at Lower Westgate Street/Archdeacon Street discovered stone blocks in situ (Figure 4.1). Here a stone wall 1.4 m wide was found with redeposited soil to its east and water-laid silts and clays to the west indicating that it faced the water (Hurst 1999: 123–124). The wall here was traced for around 16 m and constructed of lias stones set in a light brown mortar which rested on a deeper layer of large cut blocks of oolite which survived up to three courses high (Hurst 1986: 115). The wall here was also seen to overlie the remains of a substantial masonry platform which was partially covered in alluvium and may have been part of an earlier quayside leading to the river (Hurst 1988: 62).

It is unfortunate that at York there is still only limited evidence of waterfront installations because although the city is well inland, it does have many characteristics suitable for a port including its location at the tidal head of the Ouse at its confluence with the Foss (Figure 4.2; Addyman 1981: 149).

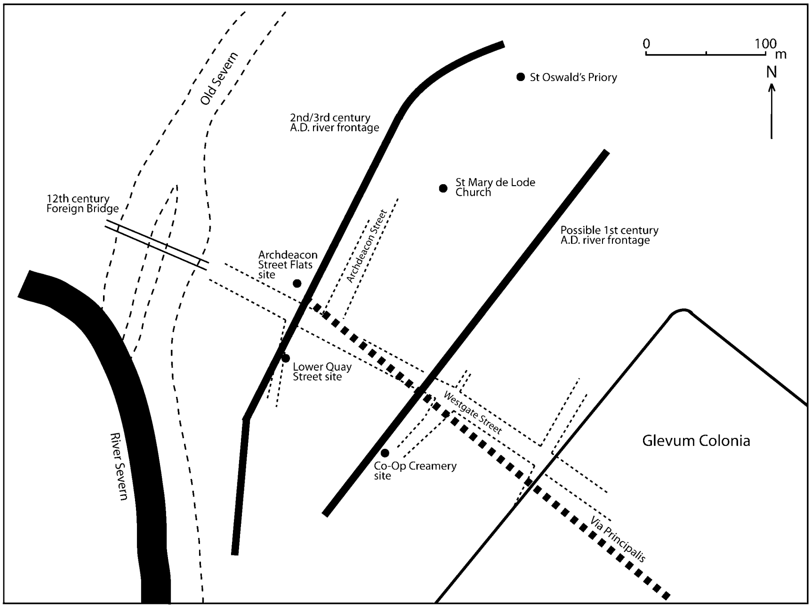

Figure 4.1. Plan of the possible Roman period port locations at Gloucester (drawn by A.C. Rogers; adapted from Hurst 1999, figure 7)

The Foss may have been dammed to produce a non-tidal port but there is as yet no reliable evidence for this taking place and there have been major alterations from the Norman period onwards. The waterfront on the other side of the Ouse in the location of the *colonia* is also poorly known but excavations near the river have produced some evidence which may be representative of more that is yet to be found. At Skeldergate, which runs along the riverfront, excavations uncovered evidence of what was possibly a hard-standing or perhaps road surface dating to the second century AD (Carver et al. 1978: 9). The slope to the river was counteracted by an increased thickness of material placed under the surface. Further along the waterfront the street becomes North Street and here excavations uncovered a linear cut running parallel to the riverfront containing substantial timber piles and dating to the late-second century (Finlayson 1993). No upstanding masonry survived here but it may have been the foundations for a river retaining wall. Whether it was also used for mooring boats is uncertain. The Skeldergate excavations revealed traces of masonry revetment or riverside wall represented by courses of masonry and this may have been part of the same feature

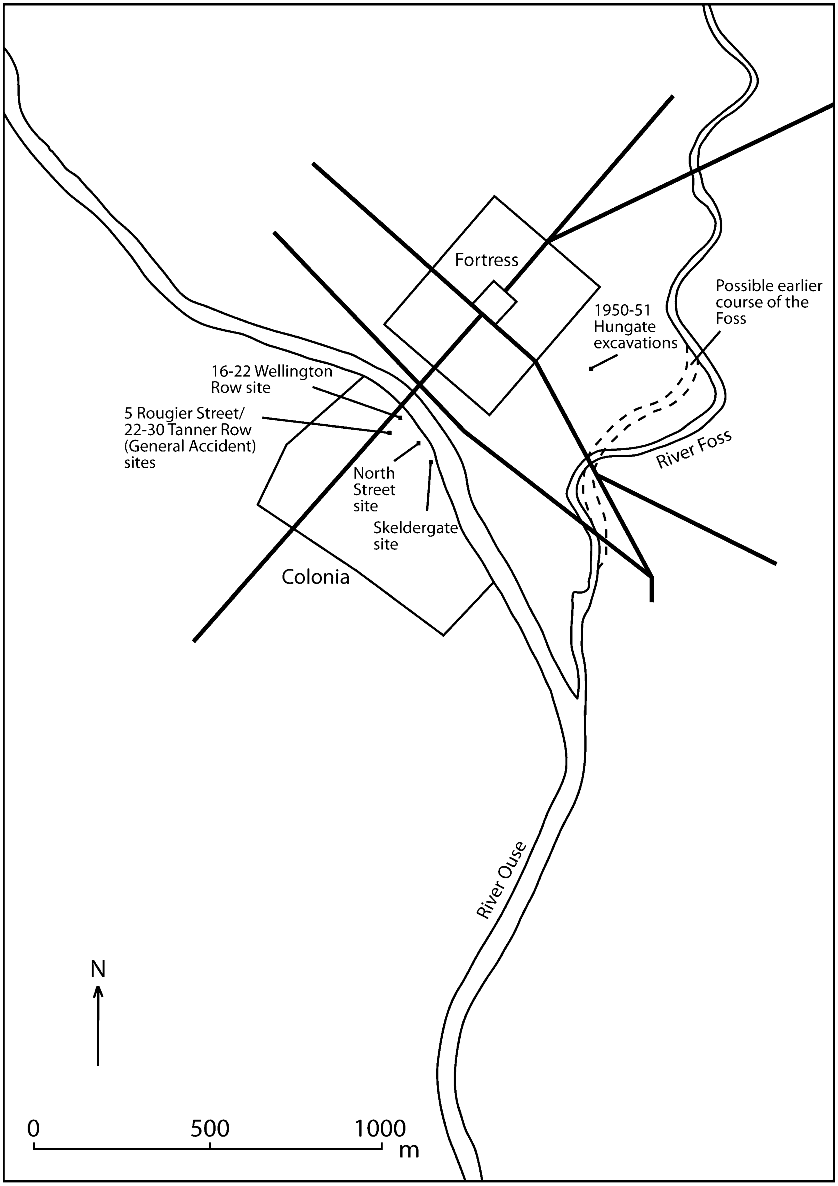

Figure 4.2. Plan of the riverscape at the Roman period settlement at York (drawn by A.C. Rogers; adapted from Ottaway 2004, figure 1)

(Carver et al. 1978: 11). The stone waterfront would have been a monumental undertaking with the clay riverbank being cut back and large stone blocks laid down and rubble used to fill the interior spaces. It appears, however, that flooding events continued here because structural remains on the waterfront were completely sealed by alluvium deposits (Finlayson 1993). Excavations at 5 Rougier Street and 24–30 Tanner Row uncovered further traces of construction activity on the waterfront but the evidence is more limited. At these sites there were ditches used to drain the riverfront area for the construction of waterfront installations but nothing was known of the waterfront area itself (R. Hall 1991; Ottaway 1981; 1982; Pearson 1984a; 1984b). It seems possible that there were wharves or at least landing places here but there is as yet no evidence to support this.

Excavations carried out by Katherine Richardson in the 1950s at the Telephone Exchange (Garden Place), on a site to the southwest of the Roman fortress, identified what was thought to have been a Roman wharf on the bank of the River Foss. Richardson described the discovery of timber piles consolidating the river and forming a wharf. There was also a paved surface which was thought to form a 'hard' and there was a masonry structure behind it described as a "massive structure" serving "water tower and guard house for those supervising the discharge of cargoes" (Richardson 1959: 55). For Richardson, the "presence of a wharf here would not be out of place. At this quay supplies brought up the Ouse for the garrison of the Fortress could be unloaded". There was, however, no stratified evidence to support a Roman date for the features and reanalysis of the excavation record now suggests that they were post-Roman features. The tops of the timber piles of the supposed wharf were in fact higher than the Roman river bank suggesting that they probably related to a timber structure of medieval date (Hunter-Mann 2007: 16). Stratigraphic analysis also indicates that the masonry structure is unlikely to have been associated with this waterfront as floor surfaces running beneath it suggested a later date (ibid.). There has been considerable alteration to the River Foss in post-Roman times making any conclusions about the area in the Roman period difficult.

At the *colonia* at Colchester some recent excavation work has identified a possible waterfront area outside the northern walls of the town in the space between the walls and the river. Excavations at St Peter's Street uncovered evidence of a gravelled surface, suggesting that the area was laid out for activity, and a previously unknown gateway leading out onto the riverfront area (Crummy 2008). It is unusual that this gateway is so close to the known North Gate and it might be that more access was needed for this waterfront area. It is unfortunate that no waterfront structures

themselves have been found but this gravelled area was a substantial construction in its own right and suggests that this could have been a busy area.

It is also worth noting that a possible harbour has been identified at Wroxeter at the foot of the river cliff outside the town walls, but so far no excavation of this area has been possible (see Figure 3.4; White 1999; White and Barker 2002: 101). At this location the River Severn forms a pool where boats could have been moored and quays and jetties constructed, but no traces of structures have yet been found. Some masonry once thought to have been part of a harbour on the riverfront has now been identified as the end of the *forum* drain which was boxed in stone to stop it collapsing as it passed under the town rampart to reach the river (Pannett 1989: 51). More work would be useful here to gain a better understanding of the relationship between the town and the river and whether there were any waterfront installations.

At Lincoln, walls are known of a possible Roman period dock on the north side of the River Witham (Thompson 1955) whilst on the south side in the area of the Brayford Pool some traces of possible timber installations have been identified (Chitwood 1991; M. Jones 1999). As discussed in Chapter 2, timber waterfronts are also possible at Canterbury. The evidence from London (see Chapter 2) is unequalled anywhere else in Britain and the level of preservation means that it is possible to carry out social analyses of the material especially through the different types of waterfront construction evident.

Construction and Identity

Through consideration of the construction and context of each waterfront installation, including the methods and materials used it is possible, as with buildings analysis, to consider the construction of the installations in terms of people's decisions, actions and the impact the installations had on people's experiences. As with town development and human behaviour within towns (cf. Revell 2009), more emphasis can be placed on the human agency associated with the construction of buildings and infrastructures. The choice of methods and materials for the building process has social implications which require more consideration. These include aspects relating to the supply and movement of materials, the organisation of construction and the way in which the processes could reflect elements of identity. Gardner's (2007) analysis of Roman period architectural construction in Britain, for example, has emphasised its importance in illuminating facets of identity through the variations in construction methods and materials used in each

structure. This is not only in connection with the main structures of the buildings themselves but also in details such as the methods of wall-bonding and floor construction (ibid. 121). This analysis can be applied to port and harbour structures in all parts of the Empire. At the port settlement of Myos Hormos on the Egyptian Red Sea coast, for example, a wharf/jetty structure was uncovered that had been constructed out of complete amphora vessels laid down to consolidate the waterlogged ground (Blue and Peacock 2006: 68–70). The vessels were sealed by a surface of trampled earth and they will have facilitated access to the shoreline from arriving ships (Blue 2011). There are practical benefits for having an infrastructure built of amphorae in such a waterlogged location because it is lightweight and relatively simple to build and shape. Similarly-built waterfront structures are known in Italy, France and Spain all dating to a relatively narrow time period in the first and second centuries AD (Bernal et al. 2005; Blue 2011). What is important here, then, is not so much the practical benefits of the construction method but how it came to be used in Myos Hormos, who was involved in this building activity and what the cultural implications were of its use in this locality.

The discussion of the waterfront installations at London in Chapter 2 demonstrated that there was a range of different construction methods and phases of development on both sides of the Thames representing different processes and motives which can be studied as an important part of the structural developments. The monumental nature of the early constructions and along with the relative uniformity of the work suggests that there was an official involvement in the planning whilst the later structures are more suggestive of work initiated by individuals and perhaps undertaken by a small team. Whilst the waterfront installations at Southwark might seem less remarkable and substantial than on the north side of the Thames they are significant for comparison with the structures on that side because there are also important social implications in constructing waterfronts and altering waterscapes. It is important to examine issues connected with who might have been involved in the initiation of the construction projects and in building the installations. Milne (1985: 145–148) and Perring (2011) have argued that the initial construction of the installations on the north side of the Thames at London was part of an official plan of development after the town was founded so the town developed the port rather than the port forming a focus for the town foundation. The constructions were certainly monumental and would have involved heavy lifting gear and very intensive labour work so it is possible that the army was involved here. The fill of the wharf at Regis House contained pieces of military equipment including armour fragments (Brigham 1998: 25) but whether this actually indicates

that army labour was used is impossible to say. One piece of timber from the quay had a stamp reading TRAECAVG which has been suggested may indicate the presence of a Thracian unit (Hassall and Tomlin 1996: 449). If the army was involved, it is possible that local labourers and slaves were also engaged in the construction and so the work would have been experienced from a number of different perspectives. It must also be acknowledged that initial alterations of the waterfront may have demanded official sanction because of the problematic context of the work. The later additions to the waterfront, however, appear to have been more piecemeal and may now have been private mercantile initiatives—individuals felt able to initiate waterfront constructions for themselves.

At Southwark, the waterfront installations were much smaller in scale and there may not have been an official plan here with the timber structures instead being built at points where they were needed. What may appear to have been relatively minor structures, however, would also have been imbued with cultural meanings. The physical act of construction will have involved interaction with the water itself and the uncertainties of the water/land interface. Each section may have represented individual decisions to alter the waterfront. The structure designs and methods of construction will also have been related to individual events and choices. They should be considered in the light of theoretical approaches to architecture where structures are constituted of the identities of those involved in their construction and use (cf. Gardner 2007; McFadyen 2006). Each aspect of the structure and where it is built represents a decision which can reflect an aspect of either an individual or group identity. In Medieval London analysis of excavated waterfront structures and documentary evidence has indicated that individual property owners along the waterfront were responsible for the maintenance of the installations and they also initiated any extensions took place which resulted in a range of different construction methods (Harvey 1954; Milne 1995). It also seems that rather than there being any specialist waterfront constructors, the activities were undertaken by ordinary builders. It seems possible that this was also the case in some periods of the Roman town.

At Lincoln, the stone quay front outside the walls of the lower town is probably the result of official involvement whilst the much slighter timber installations along the river and Brayford Pool were probably initiated at a more localised level. The stone waterfronts at Gloucester and York were also associated with official establishments whilst timber structures at towns such as Canterbury may relate to local decisions and therefore changes in which the way in which waterfronts and the wider waterscapes formed elements of the settlement structure and experience.

There is some evidence of waterfront installations in association with 'small town' settlements in Roman Britain but less in comparison with large towns. This situation is probably partly due to the fact that less is known about small towns generally—with less fieldwork having taken place—but the construction of waterfront installations must depend on the extent to which the river was navigable, the history of settlement in the area, the significance attached to the place and local attitudes towards altering the landscape. It appears that small towns often developed along the Roman road network or in association with pre-existing settlement (e.g. Burnham 1986; Burnham and Wacher 1990) which means that it is less likely that there would have been any major waterfront development at these locations.

Some waterfront installations are known, however, such as at Brampton in Norfolk. Here there is evidence of a platform of re-used timbers, retained by large horizontal wooden beams, set alongside a side channel at right angles from the main course of the river. Around 30 m to the west of this were further vertical timbers which may indicate a structure originally built out into the river (Burnham and Wacher 1990: 206; Knowles 1977). Timber piles were also found at Scole which may be evidence of a timber waterfront (Burnham 1977). It has been argued that 'small towns' might represent more local interpretations and developments of urbanism (cf. Hingley 1997b). If waterfront structures represent new forms of organisation then this might be a reason why fewer are found in these contexts.

This might also explain why there is more evidence for waterfront installations at military establishments. Coastal bases could be associated with substantial port and harbour installations, as at Dover where two stone lighthouses were also built (Philp 1981: 9; Rigold 1969). Unfortunately, little survives of the harbour installations themselves here although there is evidence that the tidal estuary was adapted and there are traces of monumental stonework surviving (Rigold 1969: 82–83). At the fortress at Caerleon there are also remains of a substantial stone quay and traces of a timber stage in front of it (Boon 1978). At Chester, however, the traditional interpretation of stone remains has now been challenged. The remains of a monumental stone wall have long been interpreted as a quay dating to the third century AD but this has now been refuted: analysis has demonstrated that this wall will originally have been taller than what remains today and this means that it is unlikely that boats will have been able to dock there. Instead, Mason (2001: 191) has suggested that the wall may have been constructed to enclose the civilian part of the settlement outside the fortress along the riverside. Within the old river bed, however, there is evidence of a jetty constructed firstly in timber and

then rebuilt in stone now represented by large sandstone blocks coming up from the bed of the river and possibly dating to the second century AD (ibid.: 149). Here, the construction work appears to have been built out into the water and it is unclear to what extent the waterfront itself was altered. These structures had practical purposes but the construction activities will also have had symbolic meanings and can be seen in terms of statements of power and purpose, transforming coasts and river lines. Waterfront architecture like other forms of building represents human decision-making and identity. The act of transforming rivers and waterscapes, and the implications that this had on the use and experience of waterfronts, was also heavily bound up in the significance of these structures.

Often before quays and other artificial waterfront structures were built along riverfronts, rivers were contained with revetments which also formed a significant aspect of the transformation of the waterscape and the biographies of rivers. On the north bank of the Thames at London there is evidence of river terracing, embankments and revetting (Brigham 1998: 23).

As we have seen, then, some waterfront installations were built in stone whilst others were in timber, and although there are practical elements to this to consider there are also cultural implications. In urban contexts, stone built installations are known at Lincoln, Gloucester and probably York (Cleere 1978; Fryer 1973; Hurst 1999; Ottaway 2004; Thompson 1955). These three towns had origins as military establishments and other military sites such as the stone installations known at Caerleon and Chester (Boon 1978; Mason 2001). The military context of many of the stone waterfront constructions might be significant indicating the ability to utilise resources and labour as well as experience in building in these contexts. It might also be possible, however, to consider these structures in terms of statements of power and authority in landscapes that were already imbued with meaning.

Altering Waterfronts: Ritual, Symbolism and Context

Ports and harbours were much more than just functional entities. Constructed at the junction between water and land they provided unique contexts in which activity could take place (cf. Rickman 1996: 290). They lead from land to water and vice versa and the process of moving between the two states would have been imbued with symbolism. The general narrative of the development of port and harbour technology as discussed above does not consider the local impact of altering places or the changing attitudes to the relationship between water and land that they represent.

Before the construction of installations in many parts of the world, boats were beached on the shore or drawn up besides riverbanks. These contexts often became important places and foci of activity even if the waterfronts themselves were not altered. They formed part of the long-term history of these places. There has been much work on the development of harbour installation technology but it is also possible to consider the history of use of natural contexts through similar processes of analysis. This often requires an understanding of the way in which the coastline has changed over time, where possible, as well as the settlements that are found in their vicinity. Blue's study of Bronze Age harbours of the Mediterranean included an investigation of coastlines and settlements in an attempt to identify early harbours. On Cyprus there is the site of Hala Sultan Tekké *Vizaja* located on the southwest shores of a lagoon or marine embayment, still accessible to the sea, now known as the Larnaca Salt Lake. This lake was probably a navigable harbour with an inlet from the sea in the late Bronze Age and there was a settlement along the shore where excavations have uncovered a number of stone anchors (Blue 1997). Blue (ibid.: 41) emphasises that the Bronze Age landscape has changed considerably especially in low-lying coastal areas that have been lost so it is important to study the palaeogeography and combine this with other evidence such as traces of settlement.

In Britain the available archaeological evidence suggests that there was not much in the way of deliberate attempts to construct artificial ports, harbours or other substantial waterfront installations before the Roman period and it is important to consider the cultural implications of this change in treatment of the land and its relationship with water. Coastal erosion and later alterations to rivers, of course, could mean that some structural evidence has since been lost. Boats were probably beached on the seashore and advantages were also taken of natural harbours where possible (McGrail 1997: 51). Much of the surviving evidence that we do have today for any installations comes from waterlogged sites. In the Somerset Levels, for example, a platform of brushwood of Neolithic date has been interpreted as a 'hard standing' where boats could rest and causeways were also constructed here (Coles and Coles 1986). Timber causeways were monumental features in their own right using large quantities of material and requiring considerable skill in construction. They could have the effect of dividing up wetlands but they did not alter them as land reclamation did. On the North Ferriby foreshore in the Humber estuary in northeast England the remains from at least three sewn-plank boats (Ferriby 1–3) dating to the early Bronze Age (c. 1900 BC) have been found (E. Wright 1990). Here, also, were light timbers and hurdles pegged to the beach in the intertidal zone which may have been the remains of

some kind of mooring point and of a contemporary date to the boats. There were waterfront constructions from an early date but the extent to which they altered the waterscape was minimal. At Dover another Bronze Age boat has also been found which may be indicative of some kind of infrastructure here. The boat had a few large chalk blocks around the outside of it which seem to have been placed there artificially and were perhaps intended to be ‘stepping stones’ to access the boat (Parfitt 2004: 100). As such they may represent some kind of minor infrastructure placed here but perhaps not a permanent arrangement for landing. The gap in the cliffs created by the River Dour at Dover provides the only suitable landing place for around 20 km as well as access into Kent and so it is likely to have been an important place in prehistory (ibid.: 102).

There has been useful work examining coastal trade in Iron Age Britain. What appears to have been an important natural harbour is known at Hengistbury Head in Dorset on the south coast near Bournemouth. Here the headland protects the sheltered expanse of Christchurch Harbour from the south-westerly winds and currents so protecting the anchorage for shipping. There is settlement here throughout the Iron Age but from the finds assemblages it appears that it was at its greatest in the Bronze Age/Iron Age transition and in the late Iron Age (Bradley 2007: 275). In this later period there were quantities of important goods including Italian Dressel IA amphorae, lumps of raw purple and yellow glass, figs and large quantities of pottery from Brittany (Cunliffe 2005: 477). Excavations here have located evidence of a fairly substantial gravel ‘hard standing’ on the water’s edge dating to around 100 BC (Cunliffe 1990: 29–31). The gravel had apparently been quarried from the nearby gravel bars which lay either side of this low-lying marshy area and would have involved the quarrying and movement of hundreds of tons of gravel representing a considerable undertaking. Nothing else is known about any port facilities here although they may have been lost through coastal erosion. There was some monumental work undertaken here, then, which changed the waterscape but apparently relatively little in the way of constructing waterfront installations.

Another Iron Age port that has been identified is at Mount Batten, Plymouth, in Devon where there is a promontory which projects out into the bay, Plymouth Sound, which is around 4 km wide (Cunliffe 1988). Unfortunately, much of the area was destroyed by quarrying in the nineteenth century but some evidence for settlement includes traces of timber buildings and gravel floors. Much of the evidence of this port consists of pottery and small finds which suggests that goods came in from along the coast and from overseas (ibid.). Away from the south coast, another site that appears to have been

an important port is Meols on the tip of the Wirral peninsula in Merseyside where there is a natural harbour known as Hoyle Lake which was a well-suited landing place for boats. A large number of Iron Age and Roman finds were recovered from the beach in the nineteenth century but any settlement that was there has now been largely washed away due to high tides and storms (Matthews 1999). Most of what is known about the site comes from unstratified objects including a large number of coins of Iron Age date in an area where Iron Age coinage was not produced locally. This would suggest considerable movement of goods and materials into and out of the harbour here. As well as these important harbours, it is likely that any sites on the coast or along rivers on which boats could have been landed or tied, would have been utilised when needed.

Investigations at Poole Harbour in Dorset have discovered evidence of more substantial constructions of Iron Age date. The remains were in the water and consisted of two moles facing each other, probably dating to the second century BC, each about 8 m wide and standing over 7 m above the seabed in a deep water channel (Markey et al. 2002). The southern mole runs for around 160 m whilst the northern mole is around 55 m. Analysis of the southern mole showed that it was robustly built with wooden piles formed from tree trunks around 12–25 cm in diameter driven into the harbour floor. Built up between and around the piles were layers of clay, coarse sand and rubble. It appears that rather than beaching at least some of the boats on the shore, they were tied up alongside the jetties (ibid.). This was a deliberate attempt to construct an infrastructure here but the coastline itself does not appear to have been altered. On the eastern and south-eastern coast of Britain, Parfitt (2004) has attempted to document any evidence there is for Iron Age coastal installations and though there is so far no positive evidence there are coastal sites with Iron Age coins which might indicate port structures though these need not necessarily have been anything substantial.

The construction of more monumental wharfs, revetments and other waterfront installations in Roman Britain were not only practical alterations of shoreline and riverbank but they indicate changes in the way in which water was encountered and experienced and changes to the attitudes to water and its relationship with land. As access points to rivers and the sea, these installations were associated with the uncertainties and dangers of water travel. But there was also symbolism in artificially bounding rivers and seafronts which may well have encouraged tensions as people had different viewpoints to the extent to which the relationship between land and water should be altered. One way in which the tensions in constructing waterfront installations might be recognised in the archaeological record is

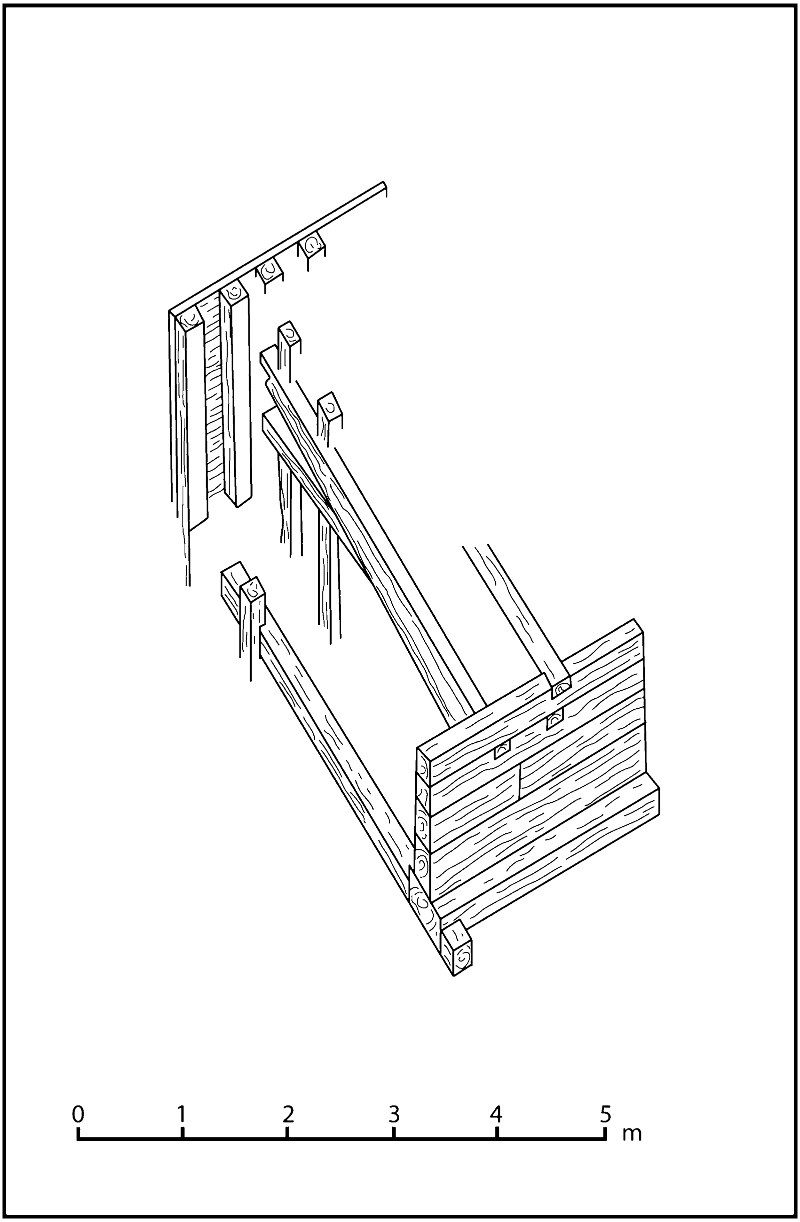

Figure 4.3. Reconstruction of the timber box quay discovered at St Magnus House, New Fresh Wharf, London (drawn by A.C. Rogers; adapted from Miller et al. 1986, figure 56)

in the nature of deposits associated with the constructions. This is where we need to turn again to the well preserved and excavated port at London and the timber wharf at St Magnus House (New Fresh Wharf), Lower Thames Street, constructed in the early third century AS part of a series of further expansions into the river (Figure 4.3; Miller et al. 1986).

Deposited within the fill of the quay was a find of over 400 unused samian vessels including cups, bowls and lion head mortaria. Some of these were still complete but the majority broke as they fell. The homogenous nature of the pottery collection suggests that the deposition took place in one or a small number of acts (ibid.: 49). The majority of the samian fell into two groups with vessels of Gaulish production dating to around AD 170–180 and then from the Rheinzarben in Germany dating to around AD 235–245 (Bird 1986). The conventional interpretation of this deposit or deposits is that the material represents vessels that were stored in warehouses, unsold, and then dumped or they were damaged stock (ibid.: 6; Perring 1991: 95). In the context of evidence of deposition across prehistoric and Roman Britain (e.g. Clarke 1997; J. Hill 1995), however, it is unlikely that the deposit of this material will have been mundane, perhaps regardless of how the material became available for deposition. Willis (1997) has identified a number of large groups of early unused and near-complete samian vessels in Britain and demonstrated that they often appear to have been deposited at times of structural or occupational change at settlements and site refashioning. Deposits of value or significant material appear to have been made at important times of structural change (ibid.: 47). Examples include around 85 samian vessels dating to around AD 60–65 from the possible fort ditch at Leaholme Gardens, Cirencester (Wacher and McWhirr 1982) and over 150 vessels from the Inchtuthil fortress placed in a gutter and sill beam dating to around AD 83–87 (Pitts and St Joseph 1985). Conventional interpretations of these finds are generally of broken or out dated material being thrown away but we can also consider that the act of deposition itself will have been imbued with meanings (cf. J. Hill 1995), as will the structural events which formed the context of the material.

The association between deposition and the negotiation of change is also relevant for interpreting material at waterfronts which saw structural change through building installations. The site of London itself has mainly been interpreted in functional terms stating the location was chosen because of the crossing point and the need to bring supplies inland along the river (Milne 1995: 39; Perring 1991: 5; 2011). Analysis of foreshore deposits has also demonstrated that the river was tidal up to London and at low tide, the northern island at Southwark projecting into the water would have provided

the lowest bridging point (Milne 1995: 39). This practical interpretation, however, neglects other meanings associated with the site: the Roman settlement would not have developed in a completely empty or 'natural' environment: "places are always already place-like as soon as we are aware of them, use them, and consume them" (J. Thomas 1996: 83; cf. Insoll 2007). The landscape at London was already embedded with meanings and histories and changes to the land will have evoked different reactions by different people. Even if this area was not a focus of large-scale settlement in the Iron Age, it does appear that the waterscape was especially meaningful here, involving ritual deposits (Merrifield 1983: 9; Merrifield and Hall 2008; Sidell et al. 2002: 30). The construction of waterfronts must, then, be analysed in the context of the meanings, activities and histories associated with the place. It is the margins of the waterscape, the symbolic liminal zone between land and water, that will have been most affected by waterfront installations and this may have provoked the most tensions and variety of cultural responses.

Waterfront Environments: Behaviour and Experience at the Land/Water Interface

As mentioned significant part of the importance of waterfront structures is their location at the land/water interface, their role in providing access to the water and allowing travel on the water. Bodies of water can be textured places and, like land, can be understood in terms of visionscapes, soundscapes, touchscapes and smellscapes (Rainbird 2007: 47; cf. Tilley 1999). For the people that exist in and around these bodies of water, these textures are knowable and fine nuances can be distinguished; perceptions of waterscapes can be learnt through experience in a similar way to landscapes and they can become socialised (Rainbird 2007: 49; Robinson 2007; Van de Noort 2011). They can have local phenomenologies with known routeways and recognisable features such as water colour, depth, the nature of the sea- or riverbed and landmarks (Rainbird 2007: 57; Wilkes 2007: 21). Waves especially could add significant levels of drama to the experience of water creating sounds and altering the relationship between land and water on a daily basis (cf. Matvejević 1999: 23). Related to waves is wind which can also have an impact on the experience of waterfronts and water itself. There are other less immediately obvious aspects to the experience of waterscapes which nonetheless would have been significant to those in close contact with the water. Matvejević's (1999) study of how the Mediterranean Sea could be experienced, describes how the variety of sea smells that people

encountered could differ from place to place depending on the depth of the water, the time of day, its relationship with the land and whether the water was calm or agitated; a similar study could be undertaken for any sea or ocean (e.g. J. Henderson 2007; Rainbird 2007). As people engaged with the sea, ocean or river in boats, through fishing or other activities, they acquired intimate knowledge of it; it was socially constructed (cf. Robinson 2007: 111). Experiences could vary greatly on a daily basis according to the condition of the water and the weather (cf. J. Henderson 2007: 48), but over the longer-term experiences could be remembered, expected and predicted. They formed an important aspect of identity and ideas of belonging at the local level.

There is a tendency through modern perspectives of sea and river to put an emphasis on the way in which water is tamed to aid transit and exploit resources. McNiven (2003: 330) has argued that this is one reason why maritime/nautical archaeology has tended to focus on shipwrecks, which are in many instances cases where the sea failed to be tamed, and on technological installations such as lighthouses. The Western perspective reconstructs waterscapes, including ports and harbours, as 'techno-scapes', with a focus on the material itself rather than its social significance. Amongst many non-Western-influenced viewpoints today and in the past, however, seascapes and riverscapes were associated with various meanings and significance and could be engaged ritually (ibid.). Beyond subsistence and technology, waterscapes were also ritualised; seas and rivers being defined by cosmologies that influenced perceptions and actions relating to the water.

Waterfronts by their very definition lie between land and water, and they are formed partly by the nature of the interaction and relationship between the two. They can be considered in terms of marginal or liminal places and points of transition from the state of being on/in water to dry/drier land or vice versa. This position can be dangerous, unstable or ambiguous; the path from land to boat being charged with possibility, danger and anticipation; a place of transition between two worlds (Westerdahl 2005: 10–11). Harbours, moreover, embraced the water and encapsulated it. Archaeological evidence suggests that these significant locations, points of transition, could become important gathering places where religious and other activities could take place. An important excavation at Washingborough 5 km south of Lincoln, for example, uncovered a well-preserved late Bronze Age site on the north bank of the River Witham on the edge of the river channel (Allen 2009). The evidence of activity here consisted of a number of raised wooden surfaces on the land by the side of the river which would have been quite a wet area. It appears that this riverside location became an important gathering place

for people whose activities included crafts and the deposition of metalwork into the river. A large wooden tank was also found with burnt stones used for heating water. The presence of barley suggested that the tank may have been used for making beer and that this site was used for feasting, ceremonies and rituals.

As Matvejević (1999: 14) described it, waterfronts can "turn into stages and worlds of their own". They are often home to specialist activities which can contribute towards the unique nature of these environments and the way in which activities were organised, influencing human behaviour. These activities can include boat building and boat repair which would have required specialist knowledge to make vessels worthy for travelling on water—an event that will always have been perilous. Parts of the work could also have been ritualised or have a symbolic element like other forms of manufacture such as metalworking (cf. Chapman and Gearey 2004: 455; Herbert 1993; Hingley 1997a). These areas of shipbuilding and repair will also have had distinctive sounds and smells unique to the activities taking place there (cf. Matvejević 1999). Although small-scale boat building and repairs could probably take place anywhere along the waterfront, very little is known about the large-scale shipbuilding yards in the Roman period. An earlier example dating to the fifth and fourth centuries BC is known on the shoreline of Marseilles whilst another is known of Roman date on the shore of the port of Olbia in Sardinia (Blackman 2008a: 662). Shipsheds are also poorly represented archaeologically although they are known from as early as the fifth century BC in Greece (Blackman 2003; 2008b; Rickman 2008: 7–8). In the Roman period, shipsheds were probably not only used in military contexts but would have been found on other waterfront sites (Blackman 2008a: 657–660; Raban 2003; Rankov 2008). No such structures are yet known from a British context.

Other specialised activities on waterfronts include fishing. Remains of fishtraps have been found at Southwark, London, dating to the Roman period (Cowan et al. 2009; Taylor-Wilson 2002: 12). It is common for fishtraps to be located on tidal flats, dynamic areas between the high and low tide marks (McNiven 2003: 336–337). This inter-tidal zone is inundated at least once a day and conditions can be highly changeable creating an area charged with meaning and danger. Fishtraps also represent a detailed local knowledge and understanding of the waters and resources and they can create a strong sense of place being used over long periods of time. Also in Southwark some timber structures on the waterfront have been interpreted as wooden tanks. Along the edge of Guy's Channel, one tank measured 3.0 by 3.5 m (Cowan et al. 2009: 105) whilst another was around 2.6 by at least 6.0 m and this one

appears to have been compartmentalised (Taylor-Wilson 2002: 26). These may have been used for storing oysters, eels or fish once they were caught and before they were sold (Cowan et al. 2009: 104). Taylor-Wilson (2002: 26), alternatively, suggests that they may have been used to keep imported amphorae but there are no traces of any amphorae sherds around these structures. Though the evidence is still fairly limited, then, they do give some glimpse into the workings of the waterfront zone. At York, excavations in the 1950s uncovered what was interpreted as a crane-base on the waterfront of the River Foss for lifting cargo on and off boats (Richardson 1959: 54–56). The evidence consisted of an area of substantial gritstone blocks measuring in total to around 7.00 by 4.57 m but there is unfortunately as yet no other evidence to support the interpretation that this represents a crane-base.

Warehouses, too, are often found on waterfronts and are more easily recognisable by their structural remains. They were often not unlike public buildings and temples in their monumentality (Rickman 1971). In Rome, both sides of the Tiber were used for unloading ships and there were some enormous warehouses (Aldrete and Mattingly 2000: 146; Rickman 1971: 5). But these were not just structures of functionality: Purcell (1996b: 277) has described there being a "romance in storage". Goods that passed through ports and harbours were stored and put on view in monumental and elaborate structures; the movement and storage of goods was a spectacle which can be considered alongside other displays within the city associated with *fora*, amphitheatres and theatres. There was also an exoticism with goods and people coming in from different parts of the Empire. Some authors have written about what has been termed the 'maritime façade' where monumental warehouses and other port structures were apparently deliberately positioned in prominent places so that they were on display and visible from the sea and surrounding settlements, such as at Carthage and Portus (Hurst 2010; Keay and Paroli 2011). They represented vitality, prosperity and power and control not only over resources but the sea itself.

Warehouses also represent a significant change in the use of, and behaviour at, waterfronts and the idea of how waterfront space and activities should be organised; this especially the case in areas where they were not constructed previously. Excavations at Fishbourne found evidence of a series of buildings beneath and around the Palace including the remains of two rectangular structures, which appear to have been granaries, roads and other buildings pre-dating the construction of the Palace (Cunliffe 1998). Although there is no dating evidence of these structures, this evidence has usually been interpreted as a military supply base associated with the Claudian invasion (Black 2008: 297; Cunliffe 1998; Manley 2002). Later excavations on the site,

however, found an assemblage of pottery dating to between 10 BC and AD 25 associated with a ditch to the east of the Palace indicating that there was activity here at an earlier date (Manley and Rudkin 2005). Creighton (2006: 54–61) has suggested there was some kind of high status settlement here from the Augustan period onwards and, with a lack of dating evidence, the granary structures or warehouses, and other evidence of activity, may belong to this and were part of a larger complex. Creighton (ibid.: 59) offers a number of interpretations including the possibility that the complex might belong to an earlier invasion, perhaps by Caligula (Gaius), or that a local elite who had knowledge of Rome had begun to style his/her settlement and retinue in a Roman way. In Creighton's book *Britannia: the Creation of a Roman Province*, he was attempting to reinterpret our conventional ideas of the conquest of Britain and how it took place. They are also relevant for exploring the way in which land and waterscapes were treated and experienced. This adoption of these new ways of settlement organisation will also have been accompanied by attitudes towards land use, manipulation and exploitation and new ways of perceiving waterscapes and the relationship between land and water.

The surviving urban evidence for warehouse structures supports the idea that they were associated with towns that perhaps had more external influences than others and there was a greater change in waterscape use and perception. At the *colonia* at York, what was probably a warehouse is known from excavations at 16–22 Wellington Row near the riverfront. Excavations here also uncovered evidence of the Roman bridgehead approach but not the bridge itself which would have led across the river to the fortress. The Wellington Row building was a large masonry rectangular building with a wooden floor dating to the late second or third century and had been built in the angle formed by the river and the north-western side of the main road. It measured around 15.5 by 10.5 m and appears to have lacked internal divisions making it unlikely that it was a dwelling or workshop (Ottaway 1993: 73–77; 1999: 141). There are other possibilities as to its function including an assembly place for meetings or a religious structure (Ottaway 1999: 147), but these various functions need not necessarily have been mutually exclusive. Nearby, however, excavations at 5 Rougier Street uncovered traces of a timber building that had burnt down and the remains included a large amount of burnt grain suggesting that this was another warehouse structure (R. Hall 1991: 179). The structure may have been quite complex since there were remains of two stone pillars that may have supported a raised floor of a timber building constructed over a drainage ditch and there were remains of a plank-lined drainage chute which would have been connected to the building (Ottaway 1982); the raised floor contributing to the preservation of the grain. It is

possible that there was a row of warehouses along the riverfront here (cf. Ottaway 2004: 90) which would indicate a fairly substantial transformation of the waterfront area and the way in which the waterscape was used and experienced.

In London the structural remains of warehouses have been identified on both sides of the Thames. On the north bank of the river the warehouses furthest west along the Thames, near Peter's Hill beyond Cannon Street Station, were found at The Salvation Army International Headquarters site dating to the first century AD and had been constructed of timber (Bradley and Butler 2008: 12). More substantial stone buildings are known from sites further east along the waterfront including those identified at 37–40 Fish Street Hill (Regis House) and at Pudding Lane/Peninsular House. At Regis House a warehouse block 14.6 m wide and at least 15.0 m long north-south was excavated (Figure 4.4). It was built as an integral part of the wharf in the AD 60s and was divided into at least six separate two-storeyed bays, each 4.5 m wide and 10.0 m long, surfaced with brickearth and there would have been timber doors on the bays (Bateman 1986: 223–228; Brigham 1998: 27; Brigham et al. 1996). In one room there was evidence of glass-working. Similar types of structures, consisting of rows of rooms, built in the AD 90s were found at the Pudding Lane/Peninsular House site (Figure 4.5; Bateman and Milne 1983: 215).

A well-preserved timber building dated by dendrochronology to AD 152–153 was found at the Courage's Brewery site on the south side of the Thames on the waterfront at Southwark. The building was around 4.7 m wide and at least 10.4 m long and was of timber frame construction and built on land that had been reclaimed (Brigham et al. 1995: 9; Cowan 2003: 58). Its form was unusual with a sunken floor and wide entrance, open place and at least two bays and it may have been designed to keep foodstuffs (Brigham et al. 1995: 60). It has been suggested that this may have been a private store because it was smaller and lightly built compared with the stone structures on the north side of the Thames (Brigham 1998: 23). Whether this was indeed the case or not, there may well have been many more similar timber storage structures representing the vibrancy of the waterfront.

On the Thames waterfront there is also a relatively high concentration of monumental buildings including the Cannon Street Station complex, the Huggin Hill bath building and the so-called 'Pre-Allectan palace' complex on the north side of the water. First constructed around AD 80–100 the Cannon Street buildings were originally interpreted as the governor's palace (Marsden 1975) but reanalysis has since demonstrated that this was a complex with a number of components of different dates probably including some kind

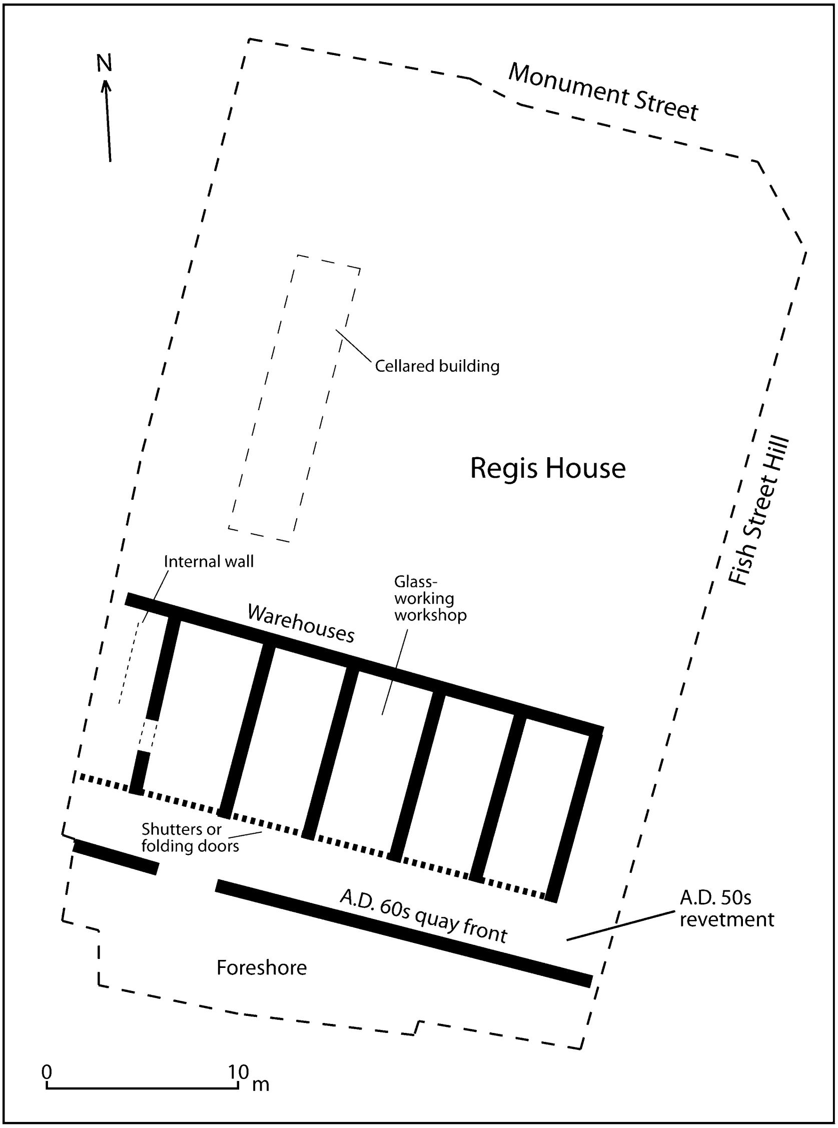

Figure 4.4. Reconstruction plan of the first century AD warehouse structure on the waterfront discovered at Regis House, London (drawn by A.C. Rogers; adapted from Brigham 1998, figure 5)

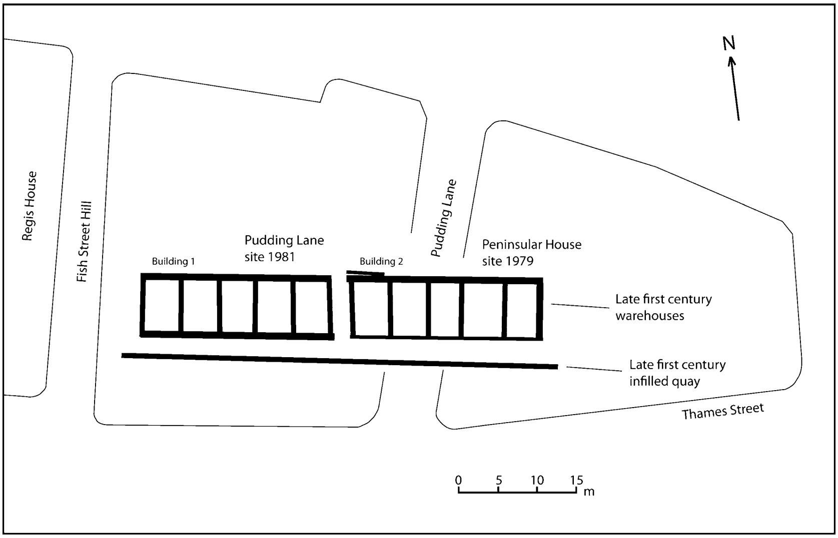

Figure 4.5. Reconstruction plan of the first century AD warehouse structures on the waterfront at the Pudding Lane/Peninsular House, London (drawn by A.C. Rogers; adapted from Milne 1985, figure 13)

of pool and temple structure (Milne 1996). Westwards past the Huggin Hill bath building is another enigmatic building sometimes known as the 'Pre-Allectan palace' complex, so called because it pre-dates the late third century 'Allectan Palace'. Evidence consists mainly of material relating to free-standing structures that had been reused in later buildings in the vicinity including a monumental arch depicting figures of gods, a screen depicting deities and two altars which would probably have stood within temples (C. Hill et al. 1980; Williams 1993). More recent excavations relating to the second complex on the site identified part of the massive podium of a temple (Bradley and Butler 2008) indicating a continuation of religious activity here rather than a palace connected with the usurper-emperor Allectus. On the other side of the river at Southwark there is another monumental complex on the waterfront at the Winchester Palace site consisting of large masonry buildings and a bathhouse (Yule 2005). The function of this structure remains unclear but it could well have had some religious functions.

The concentration of monumental architecture on waterfronts may relate to the religious significance attached to waterscapes. Excavations in the area of the mouth of the Fleet, which flowed to the west of the town, uncovered a number of metalwork finds that could be interpreted as ritual deposits

(Crummy 2008: 219). An unusual octagonal temple on a hilltop overlooking the Fleet (Bateman 1998: 56) may also relate to the religious significance of the river valley here. The Walbrook Valley also saw a concentration of religious structures as well as religious deposition in the water itself. The Temple of Mithras, first built in the third century in a wet and unstable location by the side of the Walbrook, has received considerable study (Shepherd 1998). There are also traces of other possible religious structures which are less well known because of the limited nature of the evidence and the conditions of the excavations at the time. These include the burnt remains of a wooden structure with an arcaded timber panel which could have been a shrine; associated with these remains was a face pot standing upright (Merrifield 1995: 37–38; Wilmott 1991: 178). Associated with the mithraeum were also sculptures relating to other cults and there may have been shrines devoted to Bacchus and to the Dioscuri (the twins Castor and Pollux) in the area (Henig 1998: 232); Henig (ibid.) has noted that mithraea were often situated in the vicinity of other shrines. Bird (1996) has suggested that an unusual pot sherd with a representation of a frog from the area may be related to a shrine of the cult of Sabazius in the vicinity. Similar representations have been found on pottery vessels associated with Sabazius, a Thraco-Phyrygian cult, elsewhere in Europe (ibid.). It is unfortunate that so little is known about the context of this material but the concentration of these unusual finds within the Middle Walbrook Valley suggests that this area was a focus of religious activity and that the mithraeum was just one of a number of religious structures here drawing on the significance of the waterscape.

It is clear from studies in the Mediterranean that some of the most important ports were as much about displaying messages of power and control as having a functional role and this could relate to the religious significance of their relationship with water (cf. Tuck 2008). At Portus, for example, a number of temples associated with the port have been identified through fieldwork and from known inscriptions and statuary (Keay and Millett 2005: 310–311). To the east of the hexagonal Trajanic port, where the canal meets the Tiber, aerial photography has identified a number of possible temples which may have been marking this point of transition from land to water (ibid.: 311). Material from Caesarea Maritima includes numerous statues and other traces of shrines and temples. The platform of a monumental temple to Roma and Augustus was found constructed on a natural ridge overlooking (and highly visible from) the sea which had been deliberately raised by importing a fill of earth and retained by masonry walls (Raban and Yankelevitz 2008; Stabler and Holum 2008).

Boats—Extensions of Waterfronts

Like buildings, boats contained socialised, organised and ritualised spaces (Gould 2000; McGrail 1996: 91; Westerdahl 1994). They could also be imbued with significance relating to the goods, people and ideas that they brought. Van de Noort's (2011: 201–227) study of prehistoric boats has examined aspects of their cultural biographies including their symbolic role as liminal agents in funerary activities as well as the practice of ritually 'killing' boats and depositing them whole. His study also explored the way in which sections of boats were reused in meaningful ways for different purposes involving their deliberate fragmentation. Boats were clearly imbued with considerable cultural meanings across all time periods and it is important in Roman studies that investigations do not focus solely on the practical functions of boats. Brody's (1998) study has shown that in Classical and earlier times that ships could be imbued with a divine spirit. It is also significant that when moored to the waterfront, boats could form temporary extensions of land into the water and they were important components of, and foci for, waterfront activities and they had an impact on the nature of human engagement with the water; they were integral elements of the socialised use of waterfronts.

For Roman Britain there is still only limited evidence for the physical process of using rivers in the form of boats and other vessels in the archaeological record. It is therefore difficult to carry out much social analysis of the boats although it is certainly not impossible that some of the boats found in the archaeological record had perhaps been ritually discarded. The paddle from Sheepen at Colchester might give some indication of the small boats used in this stretch of the river (Brooks and Holloway 2009). Dredging work at the mouth of the Colne identified what may have been material lost whilst transferring stock to smaller ships (P. Crummy pers. comm.), but no shipwrecks have been found. At Gloucester there were some reports of finding a boat, or at least its mast and tackle, near Quay Street in 1805 but it was subsequently reburied (Fullbrook-Leggatt 1968: 56; Green 1942: 48; Heighway and Garrod 1981: 124). What was actually found remains uncertain and it may well have been remains of medieval or later date or there may not have been a boat there at all.

A number of different types of Roman period boats are known from London; both local boats and seafaring ships. In 1910 a third century round-bottomed Mediterranean-style ship used for coastal and riverine travel was found at the County Hall site opposite Westminster (Marsden 1980: 156). It was around 18.3 m long and was probably used to take goods from the larger ships up to the water's edge. A local-style flat-bottomed riverine vessel was

found at Blackfriars dating to the second century. It was around 16.77 m long and contained Kentish ragstone that was possibly to be used in construction (Marsden 1994). In 1958 a boat or barge was found in the Guy's Channel near Guy's Hospital in Southwark dating to the second century (Marsden 1965: 123) indicating that these small channels were also used by boats. It measured around 16 m long and could float on less than 1 m depth of water (Marsden 1994). The only possible evidence for the mooring of boats comes from the Southwark foreshore where an iron socketed point around 160 mm long was found which may have been used for securing boats but there is no definite proof of this (Cowan et al. 2009: 106). Some finds appear to relate directly to material brought as cargo. This includes a complete amphora vessel containing the bones of Spanish mackerel found on the Winchester Palace site in Southwark (Yule 2005: 21), although its deliberate deposition in this watery area cannot be ruled out. More definite evidence comes from the site of the quay at Miles Lane where there were considerable quantities of broken pottery, oyster shells and fragments of wooden barrels on the foreshore (L. Miller 1982; Milne 1985; 1995: 54). The installations at London were not capable of allowing large ships to approach the riverside; these probably remained mid-stream whilst smaller boats were moored at the quays or were beached at low tide (Bateman and Milne 1983: 225; Milne 1985: 143).

Discussion

Waterfront archaeology can be used to address many social themes connected with people, settlement and water. Rivers and other elements of waterscapes were integral parts of urban settlements that had to be negotiated on a daily basis—they provoked human responses. Through human action, waterfronts in urban contexts had a materiality and this was marked further through the construction of revetments and other waterfront structures such as port and harbour installations. Artificial installations formed a major aspect of the negotiation between people and water and they altered the waterscapes in which they were established. Ports and harbours were not just about trade, transport, economics and technological capabilities; they also had social, political and spiritual aspects intimately connected with the water (cf. McGrail 1997: 49). Constructing waterfront installations inverted nature by turning water into land and so they would have formed a highly symbolic element of the relationship between towns and waterscapes (DeLaine 2002: 211; Haughey 2007: 120). The act of construction, moreover,

may well have been just as significant as the finished structures, forming memorable events within the settlements and contributing to the meaning of place. Construction methods and designs would also have been related to choices and so can be used as a means of addressing aspects of human identity within these settlements.

Waterfront zones were structured spaces and, as such, their context within settlements can be studied in terms of space that was organised, encultured and engendered (cf. Flatman 2003; Westerdahl 1992; 2005). Ports and harbours can be considered in terms of ritualised entrances and exits from one element to another, from land and water, and water and land (Rickman 1996: 290); and they could also often be points of interaction between people of different origins, incomers from various places and the local population, and they were locations imbued with tensions, fears and hopes (ibid.). The sounds, smells and activities at port locations would also have contributed to the unique nature of these waterfront environments. There would also have been unpleasant and nasty aspects of ports and harbours including the delivery and collection of slaves. Though not conceptualised or treated in the same way as freeborn humans they were nonetheless people who will have had their own experiences and considered these places in different ways. People were enslaved but land could be too, with waterfront installations representing an artificial bounding of rivers.

Through their transformation and formalisation of waterfronts, artificial installations represented new ways of behaving at and experiencing waterfronts and organising waterscapes. It might be no coincidence, then, that in urban contexts the evidence of major installations are associated mainly with the *coloniae*, which had been military establishments, and also London. The rivers at these locations were undoubtedly more navigable than at most of the sites of the *civitas*-capitals and 'small towns', and they were important for transport and trade, but there are also social aspects that should be considered. New forms of construction were imposed on waterscapes that were already culturally meaningful and they would have influenced behaviour and experience of these areas.

The majority of the *civitas*-capitals in Britain were also located at important watery places but this importance does not appear to have been connected so much with the navigability of the rivers. In these cases, the rivers could only have been used for smaller-sized vessels. Marshy areas and other components of waterscapes, however, also contributed towards the special significance attached to these places. In some of these cases more practical and reliable locations for ports were developed further afield with the journey to the town then, presumably, being completed by road. This was also

the case at the *colonia* of Camulodunum where the colony was established in a location relating to a pre-existing *oppidum* where the river was not easily navigable. Waterscapes could form significant components of the urban structure of *civitas*-capitals but the rivers were not often major navigation waterways. Marshy areas and river floodplains attracted religious activity. Waterfront installations are also known at some of the *civitas*-capitals, and other contexts, and the significance of their construction must be seen in the context of changes in the way in which waterscapes were treated and experienced as well as the practical functions that they had.

CHAPTER FIVE

WETLANDS: THE MATERIALITY OF LAND DRAINAGE AND RECLAMATION IN TOWNS

This chapter examines the association between wetlands and urban space and especially the transformation of the land by wetland drainage and land reclamation. Wetlands formed components of waterscapes and were unique contexts where water and land intermingled. There has been some useful recent work attempting to reassess the way in which wetland archaeology is studied (e.g. Van de Noort 2004; Van de Noort and O'Sullivan 2006) which can help with the analysis of the relationship between wetlands and towns here. Wetlands could be exploited for their resources but these landscapes were also acculturated by human activity. Much of the work on wetlands, however, has focused on prehistoric periods and rural contexts but it also has much to offer the study and interpretation of material relating to urban space and land use as towns developed in the Roman period and encountered and altered these wetland landscapes.

One major area of study relating to wetlands in Britain in the Roman period has been the investigation of wetland landscape transformation through drainage and reclamation but this work has tended to concentrate on rural contexts examining how land was increasingly being brought under cultivation and more intensive use over time. Land reclamation (or land claim) can be defined as the physical restructuring of the environment especially from a state of being flooded by the sea or marsh to one of drier conditions (Allen 1997; Rippon 2000a: 2). There have been especially a number of important projects examining the transformation of coastal wetlands (e.g. Allen and Fulford 1986; Locock 1998; Rippon 1996; 1997). The emphasis in archaeological interpretation of this research has been on how the land was made more amenable and useful to humans, especially for the purposes of farming. Wetland change in association with urban sites has not received the same level of study perhaps partly because of the traditional methodological divides between urban and landscape archaeology and also perhaps because of the conceptual differences in Roman studies between urban and rural contexts.

The construction of drainage channels and the reclaiming of land through dumping material and constructing new land are important aspects of the

human interaction with waterscapes and the materiality and manipulation of water. The social implications of wetland drainage and landscape change are not something that landscape archaeology has examined as much as it could with, instead, an emphasis on economic interpretations. The transformation of landscape in Britain was undertaken on a new scale in the Roman period, which also included the construction of public buildings and roads and the extraction of material and resources. A significant aspect to consider here, then, are the people that were involved in the land alterations and construction activities and whether the events formed part of an official programme, by local elites or the military, or represented more localised individual decisions and actions and new ideas about the treatment and use of land. There are some Roman period textual sources relating to some large-scale drainage and land reclamation projects in Rome, other parts of Italy and elsewhere in the Empire which indicate that there could be considerable imperial involvement in these activities. It is less certain whether such involvement occurred in Britain but military officials or local elites are likely to have been involved in some cases and it is clear from the texts that attitudes to landscape change were not always governed purely by economic and practical considerations. It is clear also that the significance of each landscape event must be considered in its local context. Through human use and interaction wetlands acquired a materiality with local meanings and the use and treatment of these wetlands needs to be considered in each context.

Wetlands and Wetland Archaeology

Wetland archaeology is an important area of research, and now a major specialism in archaeology, relating to past waterscapes and in some respects developments here have paralleled that of Roman archaeology. Both Roman and wetland studies are now more willing to recognise the value of the role that theory can play in the interpretation of archaeological material. Rarely, however, have the developments in these two areas been considered to be of much relevance to the other. Studies in wetland archaeology have tended to focus on prehistoric material or Roman rural landscapes, whilst the wetland location of many Roman towns has mainly been considered through economic and environmental perspectives (see below; e.g. at Lincoln, Dobney et al. 1995; and York, Hall and Kenwood 1990).

Wetlands are a significant part of the landscape of Britain and include a diverse range of habitats including floodplains, marshes, fens, bogs, swamps,

wet grasslands, carrs and mudflats (Acreman and José 2000: 204). They are transitional zones between permanently wet and generally drier areas and share the characteristics of both but cannot be classified as either aquatic or terrestrial; they are areas of land saturated with moisture and their ambiguity leads to uncertainty as contexts for human activity. Each wetland has unique characteristics and it is the presence of water that creates the environments of soils, micro-organisms and plant and animal communities (ibid.). The hydrologic conditions are important for determining the characteristics of wetlands and the slightest of changes, such as through human intervention, can influence the nature of the wetlands (Mitsch and Gosselink 1993).

Floodplains are the flat areas adjacent to rivers that are liable to flood but within this definition there are a number of specific types of landforms that have been identified and categorised by geographers and geologists (A. Brown 1997). Whilst the specific characteristics of these landforms may not be recognised at a casual glance today, it seems likely that they will have formed more significant elements of the local landscapes of people living in or near them in the past (although they would not have been categorised according to the same technical terms). These different elements include channel features such as bedforms (ripples and dunes) and bars, channel-edge features such as banks, benches and levées, and floodplain features such as old channels (oxbows), old levées and backswamps. River channel change can also have a major effect on floodplain sedimentation and the corresponding nature of the floodplain; they are continually changing over time and creating a dynamism to impact on the lived landscape. These zones between water and land can be hazardous which often forms part of the human awareness of these localities (cf. A. Brown 1997: 279). Riparian zones—the interface between rivers and land—are especially important in studying the relationship between urban space and rivers.

Saltmarshes are an important form of marshland and can form inland or on the coast in association with the sea. They are slightly vegetated areas bordering saline water bodies and, if on the coast, they are regularly flooded by the sea (Rippon 2000a: 14). Coastal wetlands in Britain include the Severn Estuary, Romney Marsh in Kent, the Thames Estuary (Essex and Kent marshes), the Fenland in East Anglia and the Humber Estuary. Coastal saltmarshes are higher than those further inland because they are flooded most often and so see the greatest sediment deposition and because this sediment is coarser than that laid down further inland (ibid.: 15). Inland they can form around the minor estuaries of individual rivers and could form an important resource through the rich grazing and meadowland that was provided (ibid.: 21).

Wetland archaeology has always tended to be a rather specialist area of research and whilst the technical aspects of the subject might make this necessary this has also meant that until relatively recently there has generally been less engagement with wider debates and developments in archaeological interpretation. In the 1950s and 1960s, wetland studies formed a significant component of the increasing attempts to develop a scientific emphasis in archaeology in order to produce unquestionable facts about the past. Since the early discovery of well-preserved material in wetland contexts, such as the Alpine Lake Villages in the 1850s (Keller 1866; cf. Van de Noort and O'Sullivan 2006: 21), the emphasis in wetland archaeology has predominantly been on how these preferable conditions for preservation of materials, much rarer on other types of sites, can be used to gain detailed insights into the past. It has encouraged the assumption that the material can speak for itself without engaging in theoretical issues of interpretation (this is similar to the way in which maritime archaeology has tended to approach the study of port and harbour remains; see chapter 4). Coles and Coles' (1996) book *Enlarging the Past: The Contribution of Wetland Archaeology*, for example, presents a large amount of useful material but whilst the functional interpretations of some of the finds might have proved difficult to establish, they were not generally considered to be theoretically challenging; rather past decisions and actions were driven largely by motives and processes comparable to those of today: for example, as expressed in viewpoints such as, "many chose to live in, or beside, or near water, just as they do today" (ibid.: 1).

Wetland archaeology can also be criticised, like maritime archaeology, for what has been regarded as the international 'multi-periodism' of the discipline where specialists from across the world compare the well preserved findings from watery contexts whilst less frequently considering the significance of local contextual meanings (Van de Noort and O'Sullivan 2006: 11). More attention could be paid to the local social circumstances in which these materials were found. The biologically-rich nature of many wetlands has encouraged studies of their economic exploitation such as Rippon's (2000a; 2004) work on the Roman and Medieval periods, and it is clear that each context would have been unique in the scale and variety of resources available, but it is important that analyses of wetlands are not reduced solely to economic interpretations. The richness of the material that often survives from watery contexts can also help us to assess the different behaviours, meanings, ideas and experiences of the past.

Van de Noort's work on rethinking approaches in wetland archaeology has raised the important point that the word 'wetland' itself is a relatively modern

invention, originating in the mid-twentieth century probably in the context of ecology; there was no comparable all-embracing term before this (2008: 482). This deconstruction of usage can to some extent be compared with studies of the term 'landscape'; the origins of this term, and what it represents in terms of seeing the world, can be considered in connection with the rationalisation of the land and the ideology of improvement in Western Europe from the seventeenth century onwards (e.g. Cosgrove 1984; Johnson 2007). Johnson (2007: 129) has noted that even terms taken for granted today when we think about land and land use, such as 'farm' and 'farming', invoke images relating to this psyche of land rationalisation and economic prioritisation and cannot be applied to earlier periods. Today, wetlands are often thought of as ecological units in need of preservation, and they are consequently largely separated off from settlements and the countryside alike. This situation can be seen in some present developments and proposals for urban riverfronts where they are zoned off as areas for preservation (Kibel ed. 2007).

Without the concept of 'wetland' in the past, each watery component of the landscape would have been recognised and assessed for its own characteristics and associated with individual meanings. Van de Noort and O'Sullivan (2006: 34) have compiled a huge variety of English place-names, many of which have Anglo-Saxon origins, which reflect a different type of watery feature associated with a place. These include those with suffices of -ings, -hay, -moor, -dyke, -fen, -levels, -fleet, -pool, -mere, -beach, -ford, -bridge, -on-the-water and -on-the-marsh. It seems highly probable that there would have been an equally broad range of terms in use in prehistoric and Roman Britain to describe and designate names to local places relating to watery conditions and the uses to which they were put. It is important to study the way in which people engaged and interacted with 'wetlands' and other watery features and brought meaning to them; they were acted upon by humans and through this they acquired meanings and histories (cf. O'Sullivan and Van de Noort 2007; Van de Noort and O'Sullivan 2006; 2007).

Van de Noort and O'Sullivan's (2006) book *Rethinking Wetland Archaeology* presents important recommendations for contextualising wetland sites in their geographical setting, and for accessing the people that used and inhabited them or lived nearby. Their agenda, however, has focused principally on reinterpreting the wetland archaeology of prehistoric periods. Studies of wetlands in Roman times continue predominantly to take an economic perspective and to focus on rural contexts (e.g. Rippon 2000a). Wetlands in modern scholarship still tend to be regarded in terms of 'natural' and 'wild' places (cf. Giblett's 1996 work on cultural perceptions of wetlands) and so

they are regarded as being distinct from the artificially constructed environment of urban space that appears in the Roman period or indeed built spaces in prehistory.

There have been some narratives of Roman Britain that have acknowledged the presence of wetlands where towns developed but there is considerable scope for reassessing the significance and meaning of these settings. Salway (1981: 153), for example, wrote that: "near both Lincoln and Gloucester there was riverine land that could be reclaimed … and may previously have been of little use to the locals". Frere (1967: 276), too, considered the marshy land "to be useless until drained" and may have determined the location in which the *coloniae* were founded "since the land was of little value as it stood to its British owners". The Fenland was also considered to have been of little value before the Roman conquest (Salway 1981: 6), but there is now increasing evidence of settlement and ritual activity here in prehistory (cf. Fincham 2000; J. Taylor 2007). The wetlands, rivers and lakes in the vicinity of towns were already culturally meaningful before the Roman period and the relationship between them and town development needs also to be considered in these terms. It is necessary to contextualise each wetland in its local setting and, as Van de Noort and O'Sullivan (2007: 81) suggest, "develop an empathy for the characteristics of the many wetlands as seen and understood by the people we study". We can also apply this approach to rivers, lakes, marshes, springs and other features associated with water. When examining Roman towns, then, it is also necessary to address the 'native ecologies' and 'environmental psychologies' of the local people (cf. Braund 1996a; Van de Noort and O'Sullivan 2007: 82). This includes a consideration of the beliefs and attitudes associated with 'environmental' features and the intimate knowledge of the landscape in which towns were set and how activities, memories and stories came to be associated with many of these features in the landscape. The alterations to land brought about by urban development and growth will have evoked local responses relating to the significance and history of these places.

As noted, archaeological studies of wetlands have long been regarded as being valuable for the preservation of material. It is also clear, however, that they were a focus of cultural and religious activity represented by the finds of metal and other objects and bog bodies (e.g. B. Coles ed. 1999; Field and Parker Pearson 2003; Pryor 2001; cf. Rogers 2007). As with other watery contexts, this human interaction with wetlands means that they cannot be considered in terms of 'natural' contexts. In the second edition (1998) of Bradley's *The Passage of Arms: An Archaeological Analysis of Prehistoric Hoards and Votive Deposits* (first published 1990), he emphasises the religious

deposition of objects in dry land as well as watery contexts, suggesting that the preservation of material in wetlands may have over emphasised religious activity connected with watery areas. It is certainly the case that dry land areas could be just as ritualised as watery places but this does not mean that these wet areas were any less significant or meaningful in their local contexts. There have also been some initial attempts to discern whether different values were placed on different areas of wetland. Van de Noort's (2002) study of prehistoric material from the Humber Estuary highlighted what appears to have been a trend towards the deposition of material in the wetlands associated with the Humber tributaries, such as the rivers Trent, Ancholme, Hill and Foulness, rather than in and around the Humber itself. He argued that this may have been because intertidal wetlands were perhaps valued for their high biological productivity and possibilities for exploitation whereas the mires of the river floodplains were peripheral and more suitable for religious activity. Yates and Bradley's (2010) work has also begun to document possible differences in the types of objects deposited in different watery contexts in prehistory. This work is still in its preliminary stages but certainly more work of this kind is needed in an attempt to identify whether it is possible to observe different meanings associated with the various contexts through the objects found within them.

Wetlands were also historically important for the keeping of livestock including in urban contexts. The movement of cattle to urban centres from the countryside will have required a ready availability of water and feeding grounds—wetlands thus forming significant elements of the traditions of movement embedded in the landscape. Pasture will have been an important resource at or near settlements and good areas of pasture and drovers will have moved their animals over long distances to markets and other destinations (cf. Stallibrass 2008; Stallibrass and Thomas eds. 2008). Complexes of droveways have been identified on Iron Age sites, including *oppida*, suggesting that livestock were brought in to these places from surrounding areas and these traditions, as well as new patterns of supply, will have been needed for towns. T. Moore (pers. comm.), for example, has argued for the importance of animal control and corralling as an element of power in association with the Bagendon/Ditches complex located in uplands and pointing down to the well-watered valley of the Churn where the town at Cirencester later developed. The wetland and marsh grazing of animals may well have remained an important aspect of the landscape after the town developed.

Associated with wetlands are springs and wells. Water percolates into and through rocks which are porous and permeable, such as sandstone, where it accumulates as groundwater (Park 2005a: 35). The layer of rock

through which the water percolates is known as an aquifer and springs appear where an aquifer outcrops at the ground surface and these can contribute water to streams and rivers. Springs can vary considerably in output and it is also possible to construct artificial ones (Hodge 2000b: 24). Before modern water supply systems, wells were probably the most common source of water in most settlements and these would also have drawn water from the aquifer (Park 2005a: 35). The depth of the water table reflects the balance between the rate of infiltration (recharge) and the rate of discharge at springs, rivers or wells. It also usually follows surface contours and varies with rainfall. The variability of groundwater levels over time can sometimes create stability problems for structures on the ground surface (ibid.: 36). The depth of the ground water also means that well depth can vary considerably. It appears that places were recognised for their suitability to construct wells. At Silchester, for example, the Roman town and Iron Age settlement was located at a site where there is a high water-table with abundant water beneath the shallow capping of the Silchester spur. Many wells have been excavated within the town and a leaden force pump has been found which would have assisted the lifting of water (Fox and St John Hope 1893). There are only minor streams in the vicinity of Silchester but it did also have a waterscape. Water-lifting devices are known from excavations in other towns in Roman Britain such as at London (Blair et al. 2006). At Colchester a building with a spring at its south end was originally interpreted as a mithraeum (Hull 1958: 107–113). Slots in the floor of the long semi-sunken building, however, suggest that there may have been a water-wheel here (Crummy 1980). Neck chains possibly for slaves were found on the site which might suggest that the wheels were turned by slave labour but there is no further evidence for this.

The practice of the ritual deposition of objects into wells, creating structured deposits, has been documented across Roman Britain and elsewhere. Silchester is an important example of this where a large number of wells and pits produced collections of objects including complete bronze and pottery vessels, some of with holes deliberately cut into them, and other material (Fulford 2001). It has been suggested that such deposits may relate to attempts to contact the underworld and negotiate with deities or ancestors, accessed through pits and wells (cf. Fulford 2001; Wait 1985). As such these deposits indicate the importance of wells, and groundwater more generally, as part of the cultural geography of the town.

Rainfall supplies the groundwater but it can also be collected in cisterns, tanks and other containers, such as pottery vessels, and it is likely that rainwater formed an important component of water supply in most Roman period

settlements (cf. Burgers 2001: 45–46). Water collection formed an important part of domestic architecture in Roman Italy and elsewhere. Rainwater collection tanks and other methods of storage are known in Roman Britain, such as at the Roman fort of Housesteads on Hadrian's Wall (Beaumont 2008) and in London (Williams 2003). The presence and collection of rainwater also formed part of the sensory experience within towns through processes of storage, access and use; and it involved the inhabitants directly in the water cycle. Rainwater was also perhaps symbolically significant since as it fell and ran through streets and across other surfaces it was able to traverse liminal boundaries. It also changed places, and how they were experienced, as they filled with water or dried out.

Land Drainage

Rural Land Drainage

Land drainage schemes have some similarities with irrigation practices in the way that water is controlled and moved and it is probably in relation to irrigation that the first land drainage projects developed. From at least the fourth millennium BC, artificial watercourses are known in the Near East for agricultural purposes and as the confidence in controlling water grew, more sophisticated systems evolved (Grewe 2008; Oleson 2000; Potter 1981; Wilson 2000c). Irrigation schemes and drainage in rural contexts have received considerable attention in the archaeological literature because they are important in relation to agriculture, but drainage was also an important aspect of settlement sites. As well as having an economic significance, we can also look at the drainage of land in terms of interacting with the waterscape, altering the relationship between land and water, controlling water and influencing human experience within settlements.

Italy and the Western Roman provinces relied mostly on precipitation for watering crops, making the large-scale irrigation techniques in more arid areas unnecessary (Oleson 2000: 211), but from farming manuals such as Cato's *De agricultura*, probably written around 160 BC, and other documentary references it is clear that channels used to conduct irrigation water were used (Oleson 2000; White 1970). Pliny the Elder (*HN* XIX.20.60) discussed the channels used in rural gardens whilst Cicero in *De officiis*, written in 44 BC, praised irrigation practices for what he saw as their ability to avert the harsh realities of nature (*Off.* II.12). Irrigation, then, can also be regarded in terms of its impact on the landscape and the way in which it was traversed and experienced (cf. Oleson 2000: 214; Laurence 1999).

There are some textual sources relating to a few early large-scale drainage activities where the act of drainage involved a monumental alteration of the land which took on an almost legendary status. Strabo (IX.2.40) at the end of the first century BC, for example, wrote that in Boeotia, Greece, the Mycenaeans in the second millennium BC, and then Alexander the Great, attempted to drain the land around Lake Copais which flooded in winter and created a huge reed-lake. Much later, drainage of the area also formed a project for Hadrian, as indicated by imperial letters stating that he first required estimates for the work and then he provided 65,000 HS in funds for the organisation and supply of the labour to be arranged by the nearby town of Coroneia but supervised by a term of engineers and military experts (Fossey 1982; Mitchell 1987: 338; Potter 1981: 4). Purcell (1996a: 205) has argued that these "great works of the emperor Hadrian" can be seen in terms of the "direct heirs of the palace-sponsored drainage works of the Mycenaean period. This way of thinking ... was integral to the genesis of the whole phenomenon of Roman imperialism". Hadrian was perhaps drawing on images of past greatness and also controlling and converting land as a demonstration of his authority. In Italy, some of the early drainage activities which are known from sources include the Po Basin, where drainage channels were constructed in the second century BC (Strabo V.1.11), and at Lake Velinus where Manius Curius Dentatus, a consul during the Roman Republic, initiated the construction of an outlet channel in the third century BC in order to reduce the size of the lake (Cic. *Att.* IV.15.5).

Some of the large scale imperial landscape projects also related specifically to lake and marshland drainage. The Fucine Lake in central Italy, for example, had no natural outflow and caused problems by flooding surrounding farmland. Suetonius (*Claud.* XX.2–3) recorded that Claudius undertook drainage of the lake by initiating the construction of a tunnel 6 km long which cut through the surrounding mountain rock in what was clearly a monumental task. Hadrian carried out further work on draining this lake in the second century AD but it continued to cause problems throughout the Roman period and in later times (White 1970: 148). Suetonius (*Iul.* XLIV) also wrote that Julius Caesar had contemplated carrying out drainage of the lake as part of a series of land transformation projects. According to the texts, before the later drainage operations began Claudius staged a sea battle on the lake (Suet. *Claud.* XXI.6; Dio LXI.33.3; cf. Coleman 1993: 56), perhaps demonstrating his mastery over water which would have been expressed further by having the lake drained. The ability to control, or present the appearance of being able to manage, these infamous features in the landscape was a useful way of demonstrating power and many attempted to

take advantage of this, even if they were not always in the end successful or even eventually initiated as a result of being too costly or complex. Suetonius (*Claud.* XX.1–2; XXI.6) recorded that Claudius' attempt to drain the Fucine Lake took eleven years with the efforts of 30,000 men and even then it was only drained in a very partial way.

Like the Fucine Lake, a series of attempts were made to drain the Pontine marshes, which extended along the coastline of central Italy southeast of Rome, from the second century BC onwards including by Julius Caesar, Augustus and Nero; but the area was eventually not fully reclaimed until as late as the 1930s (Potter 1981: 12). The work carried out at these sites in later times means that it is often now difficult to identify archaeologically the early attempts at drainage but at the Pontine marshes some early canal-like channels do appear as narrow rectilinear gravel and sand features (Sevink 1985). Archaeological evidence relating to land drainage in Italy also includes tunnels or *cuniculi* which are found in Etruria, Latium and other areas (Judson and Kahane 1963; White 1970: 146; Wilson 2000c: 306). These *cuniculi* could perform a number of functions including the removal of water from lakes, and the flooded areas around them, and the drainage of water from waterlogged land (Judson and Kahane 1963: 89–93; Wilson 2000c: 307); they are consequently often associated with agriculture. On agricultural land they could capture streams and lower the water table, reducing the surface flow of water. Open ditches also provided an important method for draining land and reclaiming it, especially for farming (Thomas and Wilson 1994; Wilson 2000c: 314). Columella (II.2.9–11), for example, recommended open ditches in heavy clay soils and closed drains emptying into open ditches in lighter soils.

It is clear from these examples that land drainage and transformation could be as much about representing power and authority as practical responses to necessity. Italy was always a special case but there are also many examples of imperial involvement in land drainage programmes in other parts of the Empire which are useful, such as in the area of Copais in central Greece. It is clear from the imperial interest that the emperor was keen to be involved even if he was not able to be there himself. Through imperial involvement in these drainage works, the Emperor was stamping his authority onto the land and associating himself with the power connected with land transformation. Though also functional, it is possible to argue that major drainage works were a good way of demonstrating control over the conquered land; changing the land, moreover, was making it your own. It is also possible to argue this with other construction and landscaping projects although these too were related to functional reasoning as well. A well-known letter

by Pliny the Younger written to the Emperor Trajan, for example, suggested that a canal between Lake Sapanca (Lacus Sunonensis) with the Marmara Sea (Propontis) in Nicomedia should be constructed (*Ep.* 10.41). Though this had obvious practical reasoning, the involvement of the emperor and the scale and symbolic significance of the project would have proved popular with the emperor (cf. Mitchell 1987: 352). The proposal, however, appears to have been too grandiose even for him: it would have involved considerable engineering work because of the elevation of the lake and so the project appears eventually to have been dropped (F. Moore 1950: 97; Smith 1977).

In Britain, there have been some detailed landscape projects examining Roman period rural wetland drainage and reclamation and they have revealed considerable important information about the methods and processes involved in the activities. The disadvantage with many coastal wetland landscapes today is that they have been covered by later sediments making it difficult to identify Roman period activity. This is a problem at the Essex Marshes, the Humber Estuary, the North Kent Marshes and Romney Marsh (Rippon 1999: 102; 2000a). The East Anglian Fenland, which was before modern drainage the largest wetland in Britain, and parts of the coastal areas of southwest England, however, have not been so deeply buried which has allowed some important investigations of the way in which this land was used and altered in Roman and later times.

In southwest England, the coastal Central and North Somerset Levels and the Caldicot and Wentlooge Levels in Gwent, Wales, on the opposite side of the Severn Estuary have been the subject of detailed investigation through landscape archaeology and a number of methods relating to drainage and land reclamation have been identified. Surviving in the central area of the Wentlooge Level today there is a distinctive set of long narrow fields covering a large area created by drainage ditches (Figure 5.1). Excavations connected with this landscape system established that the drainage ditches used to create these fields were of Roman date (Allen and Fulford 1986; 1987; Fulford et al. 1994). There were also a few smaller canal-like drainage channels constructed here (Rippon 1999: 119). A number of sites of Roman occupation were identified in this area with evidence of iron-working and glass-working, including at Rumney Great Wharf (Allen and Fulford 1987). It has been suggested that the level of occupation here and the field system implies that a seawall must have been constructed to prevent inundation. Nothing now survives of this structure so it cannot be verified but it would indicate quite considerable commitment to the land. The north and south areas of the Wentlooge Level, however, had an irregular pattern of fields possibly indicting that reclamation was a more gradual phenomenon. A grid

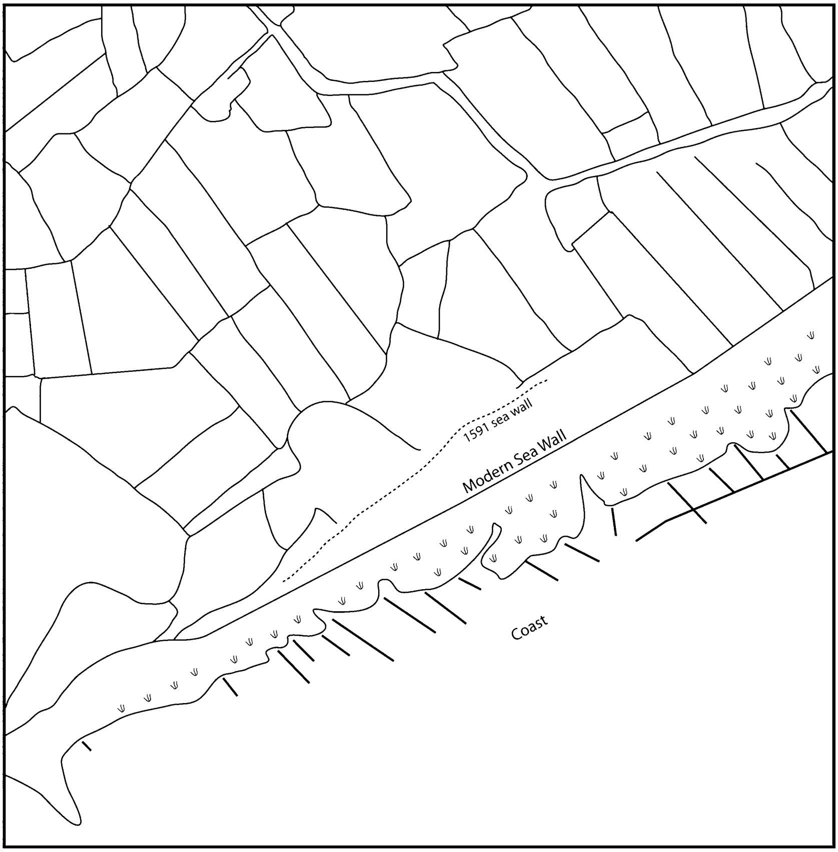

Figure 5.1. Traces of Roman period reclamation activity at the Wentlooge Level in Gwent, Wales (drawn by A.C. Rogers; adapted from Fulford et al. 1994)

of banks and gullies were also identified in excavations at the nearby Caldicot Level (Locock 1998). Here the drainage system had been filled in with clear blue clay, probably indicating flooding had taken place at a later stage.

As with the central area of the Wentlooge Level in Wales, it has been suggested that there was a seawall along the coast of the Somerset Levels although, unfortunately again, nothing survives of this structure (Rippon 1997; 2006a). Rippon (1999: 117) has argued that these seawalls need not have been as substantial as those constructed in later times and would probably have consisted of earthen embankments making it less likely that they would survive. The North Somerset Levels comprise around 100 km^2

of low-lying ground on the eastern side of the Severn Estuary. Fieldwork at a number of sites including at Banwell Moor, Kenn Moor and Puxton, identified land drainage and reclamation activities dating principally to the third century AD in the form of drainage ditches (Rippon 2000a; 2006). Analysis of the soil also indicated that a transformation from a high intertidal salt marsh to a freshwater reclaimed landscape took place (Rippon 2006b: 49). The settlements at these three sites were small with a very limited range of material culture with few examples of imported pottery, no glass vessels and few items of personal adornment. Reclamation is a risky and costly activity and Rippon (2000a: 194) has argued that these sites may represent tenants of a larger villa estate all engaged in the reclamation. Or alternatively it might be that the inhabitants of these small sites assisted each other in the reclamation activities.

Landscape analysis in the Central Somerset Levels identified two distinct areas of wetland use with the marshes in the northern part being drained with a series of ditches and the southern part left as a tidally inundated marsh with evidence of salt production (Rippon 2000b: 69). Across the area under study, the drainage ditches identified were usually U-shaped and between 1.5–2.5 m wide and 0.6–1.0 m deep. There were a small number of wider ditches up to 3 m across. As well as the drainage ditches there is a much larger historical monument surviving in the Wentlooge Level known today as the Percoed/Drenewydd Reen which runs around the outside of the marshland. It is generally suggested that this feature dated to the Roman period but there is no secure material evidence and although it appears to predate the surrounding field system, this has not been closely dated either (Rippon 1996: 32). It is possible that it functioned as a catchwater drain, collecting the rainwater that ran off the uplands and channelling it to the sea via a number of additional ditches (ibid.).

A larger monument of Roman date in Britain is the Car Dyke or Dykes which runs through Lincolnshire and Cambridgeshire along the edge of the East Anglian Fenland. This is a substantial monument, or series of monuments, and has been the subject of study and debate over a number of centuries although it remains an unusual and enigmatic feature of the landscape. As early as the eighteenth century, Stukeley (1757) stated that the Car Dyke was a Roman canal used for carrying grain to the troops in the north. Stukeley also thought that the 'Car' part of the name was a contraction of Carausius, the usurper-emperor of the late third century, whom he considered had built the monument. Babington in his book *Ancient Cambridgeshire* (1883) also thought that the earthwork functioned as a canal but Skertchly (1877), a few years earlier, proposed a catchwater drain. At first

the monument was thought to have been around 122 km long running from Washingborough, 4 km east of Lincoln, to Waterbeach 10 km northeast of Cambridge, effectively running along the western side of the Fenland. More detailed survey work of the monument, however, has since revealed that it was not a continuous monument. Instead, there was one section running 92 km from Washingborough and a separate shorter section running through Cambridgeshire (D. Hall 1987; Hall and Coles 1994). The fact that it was not continuous, and was sometimes crossed by causewayed roads, need not necessarily mean that it could not have functioned as a canal; indeed the causeways could even have functioned as simple locks providing the ability to maintain differing water levels within separate channels (Cope-Faulkner and Lane 2004: 163; Rippon 1999: 118).

There have also been some doubts raised concerning the interpretation of the Car Dyke as a catchwater drain because a monumental structure such as this might imply that there had been a large scale Fenland drainage scheme. In fact, however, there is no evidence that a comprehensive attempt to drain the Fenland in the Roman period was ever attempted (cf. Coles and Hall 1998: 59). As a catchwater it would have collected water from the high ground to the west to prevent it from being dispersed and flooding the fen-edge. The collected water would have been discharged through a series of straightened natural streams and released into the sea via another known channel referred to by its medieval name of *Midfendic* (Cope-Faulkner and Lane 2004: 164). Rippon (2000a) has argued, however, that interpreting the Car Dyke as a catchwater drain (see Wilson 2000c: 311) relies on there having been a seawall but the apparent piecemeal reclamation of the Fenland at this time suggests that there was never a seawall here. Early attempts to date the surviving sea-banks on the coast of the Wash assumed that they were of Roman date (Babington 1883: 90) but this was later disproved (Haverfield 1901: 323). Palaeoenvironmental work also indicates that the Fenland in Roman times continued to be inundated by the tide (Rippon 1997: 116).

As in the case of some river diversions (see Chapter 3), there have sometimes been assumptions made that drainage projects must have been Roman in date where there was no real evidence to support it. In fact, there were also considerable land drainage activities that took place in the early and later medieval periods which altered landscapes considerably (Rippon 2000a; 2008). Early studies of the Fenland in Roman times assumed that large-scale drainage would have taken place to utilise the area for agricultural production as much as possible (e.g. Frere 1967: 275; Richmond 1963: 128). It is now clear, however, that there was a more gradual drainage of the area over a much longer period and it was not until post-medieval times that drainage

activities took on their largest scale (cf. Darby 1973; 1983; Purseglove 1988; Rippon 2000a; Rogers 2007). In the Roman period, lower-lying areas of the Fenland continued to be used for salt production and animal rearing whilst higher areas were used for arable (Coles and Hall 1998).

Drainage in the Urban Setting

Wetlands could also form significant components of the landscape in urban contexts and the process of land reclamation could alter townscapes in monumental ways. This transformation process often began with the construction of drainage ditches and drains. The wet conditions of these contexts means that the timber and other materials used in the drainage channels can often survive well in the archaeological record. As we have seen from the case studies in Chapter 2 there were a number of ways in which drainage channels were constructed: some consisted of fairly monumental timber drains placed within earth cut ditches, in other cases there were ditches lined with timber or other materials, or there were ditches without linings. We can also use this evidence of landscape change to examine aspects of local identity and social attitudes to the land. Each drainage event will have involved particular decisions and choices and as they transformed local areas they formed significant elements of the landscape and its meaning and history.

At Winchester there were the large timber drains that were used in areas of the town that expanded off the tufa island within the floodplain of the River Itchen (Zant 1993: 25–26). The drainage channels were re-cut several times as they silted up and this act created a constant confirmation of the importance of the land and place of settlement. At Cirencester drainage ditches also formed a significant component of the urban development, though on a lesser scale, because of the location of the town, like Winchester, over a small island area which expanded onto a low-lying floodplain (Brett and Watts 2008). At London the nature of the topography, where the town developed at the north side of the Thames facing Southwark and around the islands at Southwark, consisted of a large range of drainage activities with ditches cut into the land and along roads. The expansion of the town in the Walbrook Valley and in the Southwark area was a major reason for the land drainage activities and, as will be considered later in this chapter, are likely to have been initiated at both official and individual level.

At Lincoln there was considerable drainage activity by the riverside and Brayford Pool area, again where there were originally a number of small islands, and also beyond this in the Wigford suburb area (M. Jones 2003; Vince and Steane 2001). Lincoln is a good example to raise briefly that of

course the urban waterscape was also increasingly altered and managed in medieval times—at Lincoln the city's wealth grew especially through the wool trade. By the mid-twelfth century the River Witham from Stamp End to Brayford Head had become a narrow canal crossed by two medieval bridges the High Bridge and Thorn Bridge. The water channel here, however, was never deep and it would have been easier for boats to moor around the Brayford Pool. No boat with a mast could have sailed under the two bridges without removing the mast first; shipping up the Witham from the east may have stopped before the bridges in the area of Stamp End (Vince 2003: 243). This suggests that the waterscape in Medieval times was also manipulated and monumentalized in a way that did not just relate to the practical use of the water. Nothing survives of the medieval Thorn Bridge, its modern successor was built in the nineteenth century, but the twelfth century High Bridge survives together with equally monumental fourteenth century buildings on it. There was also a greater willingness to alter the land as social attitudes changed and there was greater emphasis placed on its economic potential. The Wigford area was drained more intensively with the construction of the Sincil Dyke to the east and a dyke known as the Great Gowt (ibid.: 245). The eighteenth and nineteenth centuries saw the impact of further social changes on the city with developments such as the Lincoln Drainage Scheme (ibid.: 349).

Whilst this book has focused on Roman urbanism, its theoretical framework examining how attitudes to water and landscape can have an impact on the urban experience, is also relevant for later periods and through this it is also possible to construct the longer-term biographies of these sites. In his work on the archaeologies of the North Sea, Van de Noort (2011: 121–123) drew on the writings of Dutch philosopher Hub Zwart (2003) who has argued for the need to consider the 'moral geography of the landscape'. Zwart argued that the intensification in the transformation of coastal landscapes in the medieval period through the construction of dykes and the reclamation of wetlands was intertwined with the influences of the Christian Church and the values and obligations it encouraged. Landscapes were rationalised and perceptions of wetlands changed over time.

Land Drainage, Ritual and Symbolism

The ability to alter land and control water could form a significant element in attempts to demonstrate or gain political power (cf. Purcell 1996a: 204). Indeed it appears that large hydrological schemes were not always planned out of necessity or carried out in the most straightforward way; and some

proved too difficult or costly to ever be completed. As early as the late-sixth century BC, the Cloaca Maxima was built through Rome utilising an existing river channel. It has been argued that a deliberately difficult and monumental technique of masonry walling was used to construct it through the wet landscape when earthen banks would have been simpler (Hopkins 2007); it seems that this may have been a deliberate statement of power with the act of construction being as important as the completed monument. Pliny (*HN* XXXVI.107), though writing a long time after the event, described the construction activities as being very gruelling for the labourers and it may be that it had become an infamous event in Rome; the process of construction being remembered and stories being passed on through the generations. The monument may have formed an important element of the myths and importance of place associated with Rome.

The act of cutting into and transforming the landscape, such as with the Cloaca Maxima and other monuments, will have been significant beyond the practical results that it brought to the use of the land. Altering the landscape, in effect a living entity, would have provoked many different reactions; changing the face of the earth, shaping the world and challenging nature were hugely symbolic acts. As DeLaine (2002: 227) has put it: "large-scale construction was too powerful a symbol ever to be neutral. The art of construction is a marriage of human invention with nature". In the same way, land reclamation, irrigation and the husbandry of resources were "often sought by the most extravagant means" (R. Taylor 2009: 34). They were also forms of altering and monumentalising the landscape and in these terms they should be separated from the way in which we study and think about public buildings and other structures. Many of the changes brought to the countryside and urban spaces in Roman Britain through drainage and land reclamation were also major landscape events. All scales of alteration of the landscape, however, will have had an impact at local level altering the way in which places were used and experienced.

Ritualised Landscapes

Rural wetland drainage in the Roman period has predominantly been studied in terms of economic perspectives. Wilson (2000c: 317), for example, has stated that "drainage schemes are a potentially very fruitful area for studying the extent to which there was organised investment in land improvement for increasing agricultural profit". Wetlands have been considered mainly in terms of the resources that they can provide in their original state, such as fish and wildfowl, salt and reeds, and their potential after drainage for

arable and pasture (e.g. Rippon 1999; 2000a). This emphasis on economic value has influenced the way in which the impact of changes to wetlands has been regarded. Meddens and Beasley (2001: 154–155), for example, have argued that the use of the Wentlooge Level area by the army would have been ideal because it would not have been of any economic value to the local population and thus would not have caused any conflict. This creates a very one-sided and limited perspective of the way in which the land was used and experienced at this time since it seems unlikely that this wetland coastal landscape would not already have been of cultural value before its reclamation with the land alterations encouraging responses as a result. Fieldwork on the site of the Nash Water Treatment Works in the Levels discovered evidence for what may have been ritual activity in association with the field systems in the form of juvenile cattle and two human burials of Roman date in the boundaries (ibid.: 157). These ritual deposits may have been related to practices in pasture management but it is possible that they were also associated with responses to the land alterations.

There are some other cases where ritual deposits have been found in the context of artificial channels and drainage ditches in settlement contexts. In the section of the timber drainage channel and ditch excavated at the Brooks site in Winchester there were two near complete pottery vessels and a large quantity of animal bone (Zant 1993: 25) which could have been a ritual deposit relating to the channel. At Fishbourne near Chichester there are a number of drainage ditches with possible ritual deposits including the so-called 'Oyster Gully' dating to the late-first century AD discovered in the excavations adjacent to the villa building. Within this gully there was a large number of oyster shells as well as an intact grey ware bowl with a hole in its side and a piece of pottery rim of a different vessel placed inside it (Manley and Rudkin 2006: 75). This is reminiscent of many other cases where pottery vessels with deliberate holes made in their side form part of special deposits (cf. Fulford 2001). A ditch possibly pre-dating AD 43 has also been found near the site of the villa and it contained unusual deposits including pottery and animal bone, perhaps remnants of feasting, and a copper alloy scabbard fitting (Manley and Rudkin 2003; 2005).

In the Upper Walbrook Valley in London, excavations of land drainage activities here have produced evidence of what were possibly ritual activities associated with events. On the 4–6 Copthall Avenue site a group of virtually complete pots dating to the mid-second century were found deposited within a drainage ditch (Maloney 1990: 62). At the 6–8 Tokenhouse Yard site traces of the earliest phases of ditch construction around AD 50–70 included evidence

of the deposition of articulated horse bones, representative of at least three animals, in the lower fill of a ditch which could be suggestive of ritual activity (or perhaps just the disposal of unwanted material) (Leary and Butler 2012: 9). In a later period, between AD 180 and 250, there was evidence of possible ritual activity associated with another phase of drainage consisting of a square pit containing the cremated remains of an adult sheep. At the bottom of the fill was a worn first or second century AD coin suggesting that the fill was structured and it may represent a burnt offering (ibid.: 19). Other finds from this site may be indicative of placed offerings within this watery area and these include a Central Gaulish pipeclay figurine of a cockerel and a miniature leather shoe sole (ibid.: 13). Metal objects, including styli and toilet instruments, that appear to have been deliberately bent and deposited in ditches, gullies and across the wetland area were also found here and at other sites in the area including the Drapers' Gardens site (Butler et al. 2009).

Human remains are also known from drainage ditches and watery areas which may related to the significance of these locations. A drain associated with the masonry second phase amphitheatre at London contained five human skull fragments, leg and jaw bones as well as the complete skull of a bull (Bateman et al. 2008). At the 15–35 Copthall Avenue site in the Upper Walbrook Valley there were three human skulls: one in a canalised stream, one in a drainage ditch beside the road dated to AD 120–140 and the other embedded in material typical of channel fills (Maloney 1990: 44). These bones may have washed down from further up the valley or they may have been placed directly within the channels here. Like wells and pits, ditches cutting into the ground could have been regarded as connections from this world into the next and so should not be studied in mundane terms. It is possible, also, that they could have been considered in terms of entrapments for evil spirits (Leary and Field 2010: 122). Excavations at Moor House which lay just north of the town boundary uncovered an area that was very wet throughout the Roman period and there do not appear to have been any attempts to drain it. There were some kind of structures here, however, represented by stakeholes, postholes, gravel surfaces and possible beamslots (Butler 2006: 10). A significant find here, however, was the large number of human bones especially long bones including 27 femora, 20 tibiae, 8 fibulae, 22 humeri, 7 ulnae and 2 radii (ibid.: 38). Some of the bones exhibited evidence of cut marks demonstrating treatment after death and it is possible that the remains were deposited in a way that continued pre-Roman traditions of body disposal in areas that were liminal in nature (cf. Brück 1995).

At the Drapers' Garden site (12 Throgmorton Avenue) near to the Moor House site, though within the town boundary, came a fourth century hoard of metalwork from a well including twenty bronze, pewter and iron vessels and other metal objects along with the skeleton of a juvenile red deer (Gerrard 2009). The character of the find is suggestive of a votive deposit (Gerrard 2009: 179–180; cf. Fulford 2001) but rather than being the result of the economic and political situation of late Roman Britain, or as a mark of abandonment of the area, it could be that this deposit represents the continued importance and religious significance of this area of the Upper Walbrook Valley where there is a history of religious activity. The Drapers' Gardens excavations have indicated that some maintenance of the drainage system continued to this late date (Butler et al. 2009: 53), but in other areas it may have begun to revert back to its former marshy conditions. Either the continued attempt to control this watery area or its reversion to earlier conditions could have provoked the act of religious deposition.

The Fenland

Drainage activities altered the land creating new conditions and experiences but also intensifying its exploitation. Returning to the example of the Fenland, it is possible that one reason why it was never extensively drained in the Roman period was because of the pre-existing cultural significance of this wetland area. Here land and water intermingled and magical processes turned water into salt for human use (cf. Lane and Morris 2001). From at least the Bronze Age the Fenland appears to have been a focus of ritual deposition and many famous hoards are known from here including the late Bronze Age hoard of 6500 items of bronze-work found at Isleham and the 163 objects, including 115 spearheads of late Bronze Age date, found at Wilburton in 1882 (D. Hall 1996: 71, 82–86). Ritual activity did not cease in the Roman period but a greater variety of objects appear to have been used for deposition in hoards including coins and complete and unused bronze, pottery and pewter vessels (see Rogers 2007). There were also a concentration of Romano-Celtic shrines along the fen-edge at the sites of Willingham, Haddenham, Bullock's Haste and Cottenham in Cambridgeshire (Babington 1883: 83–84; Evans and Hodder 2006) and Prior's Meadow and Deeping St James in Lincolnshire (Hayes and Lane 1992), suggesting that this boundary between the drier upland and the wet fens was culturally significant (cf. A. Taylor 1985: 46). It is in this context, then, that it might be possible to place the Car Dyke running along the fen-edge: beyond any practical functions it had it was also a massive landscape monument cutting into the earth and it bounded the Fenland separating it off from the surrounding land.

Land Reclamation in Towns: Transformation as Architecture

The next stage in land alteration and development of the materiality of wetlands was the infilling of drainage channels, having fulfilled their purpose, and also the infilling of small streams and other water channels. In the Upper Walbrook Valley in London, for example, there is evidence that a number of the small streams in the area had begun to be infilled from the late first century onwards and the drainage ditches were infilled from around AD 120 (Butler et al. 2009: 18–19; Maloney 1990). At Southwark, too, it is evident that there were attempts to partly infill and narrow some of the channels dividing the islands over time (Cowan et al. 2009: 18–19). This procedure was often associated with land reclamation activities that followed. In the Roman period in these settlement contexts land was transformed in a major way by dumping material into watery and waterlogged areas and by building up the land. This process has been identified in a number of towns in low-lying areas, often where buildings were to be constructed, and next to waterfronts where the land was reshaped. Some of these land-changing events could be fairly small and localised whilst others were much larger in scale. What is important, however, is that these artificial constructions formed important elements of the materiality of the waterscapes in these settlement contexts and the urban structure. Through the creation of these reclaimed areas they can be considered through theories of architectural analysis and phenomenology.

Land reclamation was also important in reshaping the riverfront areas of other towns. At Gloucester there have been a number of excavations on the western side of the Roman town which indicate that part of the settlement developed on alluvial levels associated with the floodplain of the Severn. On the Lower Westgate Street/Archdeacon Street site there is good evidence for the second and third century river frontage in the form of a wall around 1.4 m wide. There is also evidence that this wall was retaining redeposited soil which lay to its east and there were clays beneath it indicating that the land had been reclaimed or newly created and that previously the river-front had been further east, nearer the fortress defences (Hurst 1986: 114–116; 1999: 123–124). Creating land through dumping material moved the river further west and made more space for activities which lay outside the town walls. This external area was an important part of the urban settlement.

At Cirencester (Chapter 2) low-lying land was built up with dumps of limestone rubble to create platforms (Grace and Holbrook 2008: 92) and at Winchester there were large deposits of material including chalk and

flint some of which appears to have been demolition rubble from buildings (Champness and Teague 2008; Champness et al. 2012; Teague 2006). At Leicester, recent excavations by the side of the river on the western side of the town at the site of Westbridge Wharf, 2–58 Bath Lane, found material that was dumped on the east bank of the River Soar to make it more stable including domestic and industrial waste and make-up deposits. The waterlogged ground conditions meant that organic remains, including leather artefacts, were preserved within some of the deposits (Finn 2003: 127). Also at Bath Lane on the Merlin Dye Works site near the edge of the water, a substantial masonry building with walls up to 1.3 m thick was built across much of the site during the later first or early second century AD, following land reclamation. Waterlogged timbers, demonstrating that the site was wet, were situated west of the building at the ends of the main wall axes and consisted of reused oak timbers placed in shallow cuts in the river gravels. These may have functioned as scaffolding bases or platforms associated with the construction of the building (Kipling 2008: 276). The function of this structure is uncertain but it appears to have been demolished by the later second or early third century AS the northwest corner was covered by the eastern rampart of the initial timber phase of the town defences which are now known to have included the western side of the town along the river. This was replaced in the third century by masonry walling, the remains of which consisted of substantial unmortared granite fragments in a construction trench and a 6.6 m length of wall, 3.2 m wide, still in situ (ibid.: 278).

Along the riverfront of the Ouse in the York *colonia*, there is evidence of land reclamation and an artificial platform probably designed to prevent flooding from the Ouse. Excavations have shown that the artificial platform was made up of a mixture of materials including peat and turves, and also a loam deposit which was rich in pottery and animal bone, and may have been from domestic refuse (Pearson 1984b: 5). At Lincoln new land was created by dumping material around the waterfronts and on the wetland areas and this activity continued through the Roman period (M. Jones 2003). As at Winchester, there is evidence of the material from demolished buildings being used in the land construction activities at London as well as dumps of silty-clay and other materials (Yule 2005; Drummond-Murray and Thompson 2002). These events were often substantial building activities and should not be considered as insignificant elements of the urban structure. There will also have been significant cultural considerations relating to the alteration of the land and its relationship to water which should not be neglected as forming part of the nature of urbanism and the urban experience.

Any form of land transformation, especially in association with water, are likely to have caused tensions and invoked various responses to the actions, and the evidence for London is a good opportunity to explore this. In the Middle Walbrook Valley the early excavations including the Bank of England site in the 1920s and 1930s, the National Safe Deposit Company site 1872–1873, Bucklersbury House 1954–1955, St Swithin's House 1949–1950 (Grimes 1968; Shepherd 1998; Pulestone and Price 1873; Wilmott 1991) produced large quantities of material that had been well preserved in the wet conditions of the area including leatherwork, other organic objects and metalwork. This metalwork was often in pristine condition and included pins, needles, styli, awls, knives and other tools and personal items but in some cases the objects had been deliberately bent. Due to the difficult conditions of many of these early excavations, the recovery and recording of the material was not always of a high standard and consequently there has been much debate over the exact contexts from which the finds came. Wilmott (1991) argued that the finds related simply to waste material or accidental losses in an area where craft and domestic activities were taking place in the buildings around the valley. The fact that these objects were in such good condition and that metalwork would normally have been recycled rather than discarded has, however, raised questions about the nature of these finds (cf. Wardle 2011: 348). Merrifield's analysis of the finds and contexts argued that the deposits in which the metalwork was found by the side of the Walbrook was exactly the same as that from the riverbed indicating that it had probably originally come from the river and had been deposited onto the riverbank after later dredging activities had taken place to clear the river (Merrifield 1995; Merrifield and Hall 2008: 126). He suggested that the excellent condition of the metalwork was a result of the objects having been deposited ritually, perhaps with some of the tools even representing termination rituals by craftsmen in workshops (Merrifield 1995). Recent analysis of metalwork from excavations at the 1 Poultry site has observed a similar pattern and type of objects as other sites in the Middle Walbrook Valley suggesting a distinct character to the material, but unfortunately the site did not extend to the stream itself so it was not possible to compare stream-bed with bank deposits (Wardle 2011: 330). Through her study of the 1 Poultry material, Wardle (2011) was not conclusive as to whether the material represented ritual activity or the objects were simply within the material dumped on the land by the side of the river to build up the area for construction. It certainly seems, however that the concentration of metal objects here does represent something more than just rubbish. It might also be simplistic to separate deposition into the river as ritual activity and the deposition of materials for land reclamation

on the riverbank as mundane. The act of depositing reclamation material here may well also have had ritual connotations since it was reshaping the land and also forming a part of traditions of deposition activity (cf. Hill 1995).

It has also been argued that during the first and second centuries at least the Walbrook valley fell within the tidal range of the Thames and at high tide water would have flowed up stream. During the pre-Roman and early Roman periods the level of the water in the Walbrook valley would have been influenced by the tides reaching as far north as the Bucklersbury House site as perhaps as far as the 1 Poultry site (Merrifield and Hall 2008: 121–122). This area of fluctuating water levels surrounded by marshland and bridge crossings may have encouraged ritual activity. The nature of this activity then altered in the later Roman period when the tidal impact reduced and instead temple structures continued to mark the religious significance of the site (ibid.: 127), including the Temple of Mithras (see Chapter 4; Shepherd 1998) and possibly a third century stone building identified at 1 Poultry (Hill and Rowsome 2011: 372). Leary and Butler (2012: 29) give a useful discussion of the pottery assemblage from the 6–8 Tokenhouse Yard site in the Upper Walbrook valley where there were a number of sherds that come from vessels which are usually thought to have been used mainly for ritual purposes including tazzae, unquentaria and a face pot. Leary and Butler suggest that if the vessels can be attributed to religious behaviour then they may also be the remains of religious rites acted out in a landscape that was ritualised (or perhaps just representative of a population with diverse religious beliefs). If so, this seems most likely to have been a result of the watery nature of this landscape where water logging and flooding was a continual problem despite the drainage and reclamation activities. This relationship between the settlement space and water demonstrates the need to consider the cultural implications of land drainage and reclamation.

The Context of Artificial Land Transformation in Britain

Earth moving and landscaping formed an important part of Roman construction activities; land was often terraced or built up and made stable before construction took place (Aldrete 1990; R. Taylor 2003: 63). This is not only an obvious and practical point since it has many social implications in terms of attitudes towards altering the land, perceptions of creating order and the labour involved. Taking the Roman viewpoint, Taylor (2003: 63), for instance, has argued that buildings in an untamed setting were not part of the Roman aesthetic with there instead generally being an urge to regularise the

landscape. The activities could have included the felling of trees and removal of other plants, the removal of large quantities of earth and stone as well as the raising of surfaces to make them level, all of which will have been very labour intensive (DeLaine 1997; Shirley 2001; R. Taylor 2003: 63). The monumental exercises in land transformation of many of the large buildings may have involved more labour than the building of the structure itself and this must be recognised in any analysis of the meanings and biographies associated with these buildings.

In a provincial context, however, it is also important that the focus of attention is not solely on the elite viewpoint from Rome and that local attitudes to land, land alteration and construction work are also taken into account. It is fairly common to argue that as the Roman conquest of provinces took place, the military and forced indigenous labour made it possible to bring large areas of land under cultivation including through forest clearance and marshland drainage (e.g. Leveau 2007: 655). Whilst the conquerors may have wanted to apply similar strategies and techniques to all areas, in practice they will have needed to adapt to the nature of each province.

The way in which waterscapes were altered by human action in Roman Britain also need to be considered in the context of the longer-term use and alteration of the landscape. Not of unimportance here is the considerable work that has taken place in documenting the context of the rise of prehistoric monument construction in Britain and across Europe, and how the landscape, and experience in it, was altered as a result. Though relating to periods well before Roman times it is nonetheless relevant to review some of the arguments that have been made. Bradley (1998: 68) has argued that the initiation of monument construction in Europe was linked with the beginnings of domestication which, significantly, he has considered in terms not only of changes in food and resource production but as being a state of mind (see also J. Thomas 1991). It has been argued that in the Mesolithic, human identity did not lie outside nature and, therefore, the acceptance of domestication required a significant modification of the world view which came at different times to different areas across the world (Bradley 1998: 34; cf. Hodder 1990). With new attitudes to land, and its use and exploitation, represented by the domestication of plants and animals, monuments also began to alter the earth as part of this new command of the landscape (cf. Bradley 1993). Whilst the land began to change through constructing field systems and monuments, however, it does not appear that rivers and other watery contexts as part of the landscape were altered in the same dramatic way. Monument construction, however, could affect the relationship between water and the land.

Richards' (1996) study of Neolithic henges has argued that attempts to classify and understand the monuments have been preoccupied too much with the structures themselves isolating them from their topographical settings. Richards has demonstrated that in a number of cases the visual appearance of henges would have been different from what is usually assumed because it is known that the enclosure ditches, such as at the Stones of Stenness and Ring of Brodgar on the Orkney Islands, would often have been full of water. In other instances henges were in close association with lakes or rivers and in some cases there are even earth or stone paths known which linked them with streams or rivers, such as at Broomend of Critchie, Grampian (ibid.: 320); the water channels were integrated into, and equally important aspects of, the monuments. Richards argued that henge monument architecture embodied a microcosm of landscape with water forming a major part of the architecture. Whilst the rivers and other watery contexts were clearly highly symbolic features of the cultural landscape in these instances, they do not appear to have been physically altered themselves in any major way through the monument construction.

The later Neolithic chalk mound monument of Silbury Hill in Wiltshire also appears to have been deliberately located in a low-lying position near the source of the River Kennet. This location meant that the ditch dug around the monument would probably have been full of water for much of the year (Leary and Field 2010: 149–150). Analysis of the construction and dating of the mound itself suggests that it was not initially conceptualised in its final form but only gradually gained height over time, representing individual events over a long period where people came and deposited more material (ibid.: 124–126). It may be that these actions were commemorating events and rituals taking place in this watery area and the resulting nature of the mound itself was less important. It might be of comparable relevance, then, that many of the Roman towns in Britain, too, were established in low-lying watery areas rather than on more prominent higher and drier ground.

Wetland archaeology has shown that lakes and marshland contexts were deliberately selected for settlement in prehistory, such as in the Glastonbury lake villages in Britain (Coles and Coles 1996; Coles and Minnett 1995). Structures relating to these settlements could be monumental and involve huge amounts of timber and other materials, as we can see from lake villages such as the Iron Age island site of Biskupin in Poland, but the construction of the settlements did not alter the lakes themselves in any major way (Coles and Coles 1996; Harding and Rączkowski 2010). In Britain there is evidence that some small-scale drainage and settlement took place at some inland

wetlands in prehistory, especially around river gravels in the Middle and Late Iron Age (Fulford and Nichols eds. 1992; Lambrick 1992; Rippon 1999: 101), but there is no evidence for the same level of drainage and land reclamation that we see in the Roman period at either coastal and inland sites. One explanation that has been given for this intensification of reclamation of coastal wetlands in the Roman period is that there was a reduction in tidal levels in the Roman period which made land transformation schemes more feasible (Rippon 2000a). Other explanations for the increased exploitation of wetland areas in the Roman period might be the desire and/or need for larger areas to be put under agricultural production as well as the greater quantity of resources that were now available to carry out the changes. These reasons do not mean, however, that the social significance of the physical implementation of these schemes and the cultural impact of these changes would have been any less important. We can also view the development of Roman townscapes and their impact on land and waterscape change in the context of this longer-term increase in exploitation of the environment and willingness to alter the earth.

Land Transformation and People

Cutting into land, moving water and depositing material, formed important aspects of the relationship between urban spaces and waterscapes. This landscape activity and the act of re-cutting and maintaining the ditches will have formed a significant element of the way in which the importance of place and local identity were affirmed (cf. Bevan 1999; C. Evans 1997). In some early experimental work on prehistoric monument construction methods, Startin (1982) calculated that about 0.68 m^3 of earth could be moved per hour by a team consisting of one picker, one shoveller and a number of carriers. Though such experimental work can only ever provide approximations, and can never recreate the exact conditions, circumstances and attitudes of the time, it can provide an idea of the scale of the work. A considerable amount of labour was clearly needed in any form of ditch construction. Fulford and Allen (1986: 114) conducted calculations to estimate the work needed in the drainage ditch digging activities to reclaim the land in the Wentlooge Level. They identified at least 320 km of ditches here which had an average cross-sectioned area of 7.75 m^2. They estimated that the volume of spoil in total that would have been dug out would have been around 2.48×10^6 m^3 and it would have taken a picker and shoveller and one or two basketeers to move around 1.02 m^3 per hour. This would have meant that 500 people working for

six months of the year would have taken 8–10 years to complete this task. It was a massive undertaking and rather than such a large group of people being involved, Fulford and Allen argued, realistically, that it is more likely that smaller groups undertook the work over a longer period (ibid.). Through this work involved in ditch digging it formed part of a massive commitment to land. The process may also have reinforced social relationships and created a sense of social cohesion which was perhaps especially significant in the construction of prehistoric monuments (see below; cf. Leary and Field 2010: 122; Miles et al. 2003: 98).

There have also been studies examining the use of resources and labour in Roman period constructions. This includes studies of road building (e.g. Laurence 1999), monuments such as Hadrian's Wall in the north of England (e.g. P. Hill 2004) and public buildings (e.g. DeLaine 2001; Salmon 2001) and it is clear that building activities could often be ostentatious beyond functional needs (cf. Mattingly and Salmon 2001b: 7–8). In Roman Britain, although there were buildings constructed in stone and brick, wood continued to be important as it was in prehistory; wood was often used for monumental buildings: hillfort ramparts, for example, required considerable quantities of wood, preparation time and labour (cf. Lock et al. 2005: 96–97). The construction of prehistoric monuments, whether henges, burial mounds, stone or timber circles, hillforts or enclosures also required the movement of large quantities of material. Studies of monument construction, however, have also suggested that the building activities, including the choice of materials to be used, could also be imbued with symbolic meaning (cf. Cummings 2012; Sharples 2010: 116–124). Analysis of the Iron Age hillfort at Segsbury, for example, has demonstrated that the later rampart was made from a type of chalk that was brought from some distance away to the site even though there was local chalk that could have been quarried for the same purpose (Lock et al. 2005: 143; Miles et al. 2003). In a number of cases, moreover, specific stones and soils were sought rather than simply using local material and they appear to have employed in meaningful ways; in many cases, these materials would have been invisible as they were covered over; Sharples (2010: 118–119) has suggested that these actions may have been a means of creating physical links with the landscape and its inhabitants. Bradley (2007) has also noted the importance of using materials from particular places in the construction of monuments in earlier periods—a well known example being Stonehenge (Castleden 1993). Cummings' (2012) study of the construction of Neolithic chambered tombs in Britain, and the sources of stones used, has argued that the perceived qualities and essences of stones influenced their choice and use in monuments. Stones

had different meanings and so specific sources were deliberately sought and acquired biographies through quarrying, movement and installing within the monuments.

As well as materials, the act of construction itself—putting something into being—could be meaning-laden and a significant cultural event (cf. McFadyen 2006; Revell 1999). Architecture can be regarded and studied not just in terms of the end product but also as an act of construction and creation of space; technology itself is not simply a neutral tool but embedded in social meaning (Dobres 2000; McFadyen 2006). Knowledge of, and attitudes towards, technological processes are passed on, learnt and adopted in the social context (cf. Budd and Taylor 1995; Dobres 2000). Building events could also be associated with other activities: for the monuments of later prehistory, such as hillforts and *oppida*, for example Sharples (2010: 120–123) has argued that the mobilisation of labour and resources may have been related to elite authority and competition; and construction events may have been associated with feasting and other activities to encourage people to participate (cf. Lock et al. 2005: 98). It is not inconceivable that, at least in some cases, some similar traditions of involvement and labour organisation could have formed part of the processes of urban construction in Roman Britain.

It is known from inscriptions and documents that taxes and local benefactions were the main way in which the construction of public buildings and urban amenities were funded in the Empire if there was no direct imperial involvement (Abbott and Johnson 1926; Duncan-Jones 1990; Hardy 1912). Official involvement would have meant that the army was involved in the construction; and criminals, who were used in projects as a form of punishment, and slaves could also have been used. Surviving sections of the town-charter (*Lex Coloniae Genetivae Juliae*) from Urso, modern Osuna,[1] in southern Spain stipulated that citizens and other inhabitants of the town had to participate in local building works as a compulsory conscription but the number of days that they had to work yearly was minimal and this form of labour probably did not contribute very much to the overall construction activities (Duncan-Jones 1990: 174–175; Hardy 1912). There are no similarly informative texts known from Britain but such arrangements remain a possibility along with slave, paid and military labour (cf. Blagg 1980). Whilst the

[1] Two bronze Tables were found in 1870—one complete but broken in two and the other incomplete—and in 1874 two further partially complete Tables were discovered. In total still less than half of the law has been found. The law contains the charter granted to the *colonia Genetiva Julia* established by Julius Caesar (Hardy 1912: 7).

subject of imperial and elite patronage in the construction of public buildings and urban infrastructures has been the subject of much investigation (e.g. DeLaine 1997; Laurence 1999; Mitchell 1987), it is important to consider land alteration as a significant part of this.

Land drainage and reclamation can be considered in terms of both technology and architectural creation. This technology reorganised the world and altered the way in which the land and water were encountered and experienced. Land reclamation was a form of monumental construction which raises important issues regarding how and by whom the work was carried out at each place. This includes the construction of drainage channels and timber drains, the infilling of water courses and the dumping of material on the land. There has been considerable debate regarding who would have initiated drainage activities in the Fenland and this is also important for considering wetlands in other contexts. The extent to which there was state or imperial involvement in these activities has received much discussion. The farming manuals (e.g. Cato *Agr.*), laws (e.g. see Bannon 2009) and archaeological evidence from rural sites in Italy indicate that small-scale drainage and reclamation activities took place on an individual level (Wilson 2000c: 314). The East Anglian Fenland, however, has often been considered in terms of a single entity. According to Salway (1981: 6), the Romans "opened up virgin lands (in the Fenland), engineering drainage and introducing population". It has been argued that as virgin lands, the Fenland would have become state property, an Imperial Estate, with salt production being under imperial possession and grain produced to supply the army (Frere 1967: 275; Phillips ed. 1970; Richmond 1963: 128). A monumental tower structure excavated at Stonea, an island of higher ground within the Fens, is one of the few substantial structures known in the Fenland and it has been interpreted by some as a headquarters building for the Imperial Estate (Jackson and Potter 1995), but there is no positive evidence to support this interpretation of its function. A Roman inscription is known from Sawtry in the Cambridgeshire Fens with the letters public[um], referring to public property, (Collingwood and Wright 1965: 230) but this need not relate to the whole Fenland and may instead have demarcated public from private land more locally. The Fen Causeway which is a major road that crosses the Fenland has also been regarded as forming part of the imperial programme (Potter et al. 1981: 131).

There is also considerable reason, however, to argue that the Fenland was not an imperial estate (cf. J. Taylor 2000). It is now known that there was considerable activity in the area in the Iron Age and earlier prehistory so it was not virgin lands (e.g. Hall and Coles 1994; Hayes and Lane 1992). In the Roman

period, pastoralism continued to form an important part of the agricultural regime here and Fincham (2002) has argued that cattle may have formed an important expression of wealth amongst the local population; although there are few large domestic structures known across the Fenland, the population need not have considered themselves poor: they were expressing their wealth in other ways. The symbolic and ritualised nature of the wetlands here, moreover, might suggest that the Stonea structure could have been some kind of religious building surrounded by wetter ground.

The drainage and reclamation activities in the North Somerset Levels also suggest a more gradual approach to landscape change associated with individual villa estates in the area rather than an imperial endeavour. One large villa is known here at Wemberham and it is possible that this was the main landowner leasing out land and taking charge of the reclamation. Alternatively, as Rippon (2006a: 77) has argued, several villa owners may have been involved (Rippon 2006a: 77). Rippon (ibid.) has suggested that the amount of effort required to protect an area from tidal flooding in the past, including by constructing embankments, can be over-estimated since it would have been feasible for groups to embank small sections of the coast.

Across the Severn Valley in Gwent, a stone inscription found in 1878 at Goldcliff, around 11 km from the fortress at Caerleon, records the construction of 33.5 paces of an unspecified work by the first cohort of Legion II Augusta (O. Morgan 1882). The exact find-spot of the Goldcliff stone is problematic but the records have suggested that it may have come from the foreshore at the bottom of a ditch (Allen and Fulford 1986: 114). The style of the lettering on the stone has led to the suggestion that the inscription was third century in date (Locock 1998: 330), but the nature of the construction work itself is uncertain. It has traditionally been argued that the construction work was an artificial seawall. Another interpretation is that it represents a structure relating to drainage or that it demarks the boundary of the territory of the fortress at Caerleon (Boon 1972; Meddens and Beasley 2001: 154–155). Despite this uncertainty, the Goldcliff stone has been used to argue that there was military and state involvement in the reclamation of land in this area of the Caldicot and Wentlooge Levels (Allen and Fulford 1986: 115; Locock 1998). The close proximity of the fortresses at Caerleon and Cardiff, and the regularity of the field systems, indicate that it is possible that the land was being used as areas of pasture and arable to supply the army (Frere 1967: 276; Rippon 1997; 1999: 112). A textual reference, though not for Britain, mentions the Emperor Probus (AD 276–282) employing soldiers to dig a ditch to relieve winter flooding near Sirmium in modern Serbia (SHA *Prob.* XXI).

For the Roman period, then, it is known that the army and forced labour could have been involved in construction projects. There are also inscriptions indicating that auxiliaries were involved in the excavation of at least part of the *vallum* along Hadrian's Wall (P. Hill 2004: 121). The military and slaves could also have been used in land transformation activities in early urban contexts. At London the likely military involvement in the construction of the waterfront on the northside of the Thames may indicate that it was also involved in at least some of the early land drainage and reclamation events (cf. Cowan 2003: 13). The available evidence from a range of sites suggests different elements of involvement with some large-scale land transformation and the movement of materials for reclamation and in other cases much more localised and small-scale raising of land carried out by local landowners; sites where both processes have been identified include Drapers' Gardens and 1 Poultry. At the Drapers' Gardens site there was a large amount of building material deposited here (Butler et al. 2009) and at 1 Poultry some of the earliest activity involved large dumps of natural gravel reformulating the terrain (Hill and Rowsome 2011: 22). In the Upper Walbrook Valley it has been argued that there was a public programme to control the Walbrook and its tributaries and to utilise as much land as possible. Maloney (1990: 120) has suggested that this area of the town may have been designated as an official area to dump rubbish within the town so that the land could be built up. The land-claim material here does appear to have consisted mainly of domestic and industrial waste but these activities could as likely have been carried out through individual private initiative as central planning. Certainly, east of the *forum* in the Fenchurch Street area, it has been argued that the drainage ditches excavated here are more likely to represent casual, piecemeal drainage into the Lorteburn watercourse in the late first and early second centuries, rather than a concerted attempt at reclamation (Bluer and Brigham 2006: 17).

Cowan et al. (2009: 11) have argued that the land transformation activities at Southwark may have been part of a deliberate land management scheme from the first century AD. If so this can perhaps be seen as part of an official programme of landscape exploitation after the conquest and a deliberate attempt to alter this area. It has also been suggested that the expansion of the settlement at Southwark through land reclamation in the early second century formed part of a wider building programme in the town which also included the construction of the new *forum-basilica* and amphitheatre and the drainage of the Upper Walbrook area (Cowan 2003: 57).

The monumental nature of the drainage activities at the Brooks site in Winchester suggests that there was some degree of official involvement and

planning here coinciding with the construction of the public buildings. The demolition of early masonry buildings which formed part of some of the reclamation dumps here as identified at the Pilgrims' School site (Champness and Teague 2008; Champness et al. 2012) may be an indication that there was some official decision making and planning that went into the process, as can also be seen at London (Yule 2005: 20). At Winchester the reclamation activities at the Pilgrims' School site appear to have dated from the later second century onwards and perhaps related to decisions of the town council. The dumping of large quantities of material over a short period of time may also suggest that some official organisation was involved. Apart from these large projects, it is likely that most changes took place at a more localised level as land owners developed their own land and the settlement expanded.

Without written records for these events in Britain the dating evidence and scale of the activities might be especially useful to help us discern who initiated them as well as an understanding of the nuanced processes involved in each case of urban development since there will have been different people, events and reactions associated with each one (see also the next chapter; cf. Creighton 2006). The dating evidence indicates that many of the larger-scale activities, such as the construction of the Winchester drainage system, the early drainage north of the Thames at London, the construction of roads and associated drainage ditches at Southwark and the deposition of the building material on the Thames waterfront, took place around the second half of the first century AD and early second century. It is possible that these early and more extensive activities involved some kind of official initiative whether this was local elites, perhaps drawing on existing traditions of labour organisation and cultural meanings and activities associated with such events, or the incoming military or some other form of organisation. The smaller scale drainage and reclamation events dating mostly from the end of the first century AD onwards, in the Walbrook Valley, parts of Southwark and the Wigford area at Lincoln were probably the result of more localised initiatives by individual landowners. At Winchester there were continued drainage and reclamation activities through the second and third centuries suggesting that such activities, interacting with this wetland landscape, would have become an important part of the identity and nature of the town.

These activities, however, were not mundane actions and the large-scale programmes may even have been regarded as demonstrations of power over landscapes that were already meaningful. They may also have demonstrated what was possible to do to the land by interacting with, and changing, the

relationship between water and land and this then continued through the smaller-scale events. This treatment of land can also be considered as part of an increased exploitation of the environment that we also see in rural settings but it is also necessary to acknowledge the impact of these changes on the way in which these places were experienced as settlements. In the same way as with waterfront installations, it might be possible to argue that as social knowledge and attitudes changed towards the technology and results of land change, more people became willing to engage in land alteration; it perhaps became less problematic to alter these places. Through smaller-scale activities, individuals were engaging with the land themselves and this may also have involved religious negotiations as can perhaps be seen in the Walbrook Valley (cf. Merrifield and Hall 2008).

In late Roman Lincoln, there is evidence of extensive phases of dumping into the River Witham in an attempt to consolidate and extend the bank in the mid-third to late-fourth centuries AD (Dobney et al. 1995: 11). The dumped materials consisted of large quantities of well-preserved animal bone comprising mostly of butchered cattle remains. From the quantity and character of the cattle bone assemblages it has been suggested that they might indicate centralised or municipal butchery (ibid.: 58). Whether or not the butchery was centralised, it does appear that there may have been large-scale land-fill activities to claim the land from the water suggesting that there was either some kind of official involvement in the later Roman period or that there was co-operation amongst the townspeople to carry out the land-claim at this time. Overlying these deposits was a metalled surface dating to between the early-fifth and tenth centuries representing the early medieval waterfront.

Landscape and Knowledge

Land drainage and reclamation activities were not always successful in removing or reducing the presence of water and there is also evidence that some attempts to alter drainage systems and build roads and structures on land had the effect of making the land wetter. Urban building will have affected surface drainage characteristics of an area by replacing formerly permeable soil with roofed buildings, pavements and roads; towns can also affect surrounding terrain and river flow (Mauch and Zeller 2008a; Wilson 2000a: 151). Excavation and test-pitting over a fairly large area of what was Roman Canterbury at the St Mildred's Tannery site revealed clear evidence of these processes. The site lay in the western part of the town and west

of the intramural branch of the Stour and within its floodplain. It is clear that this part of the town had a high water table and was often wet. Fieldwork, however, has indicated that there was a fairly dense network of roads extending over most of the area with possibly around fifteen building plots here (Pratt and Sweetinburgh 2004: 11). There is no evidence of the function of any of these buildings but they were probably residential, some with evidence of craft activities. Part of a large stone building with an apse exposed close to the London Roman Gate and Watling Street may have been a *mansio* (Blockley 1987: 18), or perhaps a bathhouse (Pratt 2007: 7).

Occupation downstream worsened the drainage problems of this area and excavations have demonstrated that it soon became too difficult to continue occupation here which became increasingly flooded over time. Around the third century, it appears that all the buildings in this part of the town were systematically demolished and the area became marshland, with the marsh remaining a prominent part of the town into the medieval period (Pratt and Sweetinburgh 2004: 12). The timber posts of buildings were broken or sawn off and the stumps preserved in the ground. Flood deposits were also identified over Watling Street (Panton and Elder 1992: 374–375) and other roads in the area (Bennett 1982: 8). Work on the Marlowe Theatre site, also in this western part of the town, has revealed a similar sequence of buildings being abandoned in the third century (P. Bennett pers. comm.). A possible religious response to the difficulties caused by the flooding in the town can perhaps be seen in the late Roman silver hoard deposited in the water-filled town ditch excavated at Rheims Way (Frere et al. 1982: 34; Johns and Potter 1985: 312–352).

The Upper Walbrook Valley in London is another area where dense settlement downstream, along with attempts to artificially control drainage, appears to have encouraged flooding problems. The area became increasingly wet over time and caused the silting up of the Walbrook (Maloney 1990; Merrifield and Hall 2008: 121), although drainage activities also appears to have continued at least in some areas (Butler et al. 2009; see Chapter 2). The construction of the town wall in the third century also appears to have impeded the flow of the Walbrook and the very northern part of the town became more waterlogged and marshland began to form or return to the area (Butler 2006: 5, 37). It is uncertain whether the wall engineers understood the hydrology of the area and knew that the wall could lead to a greater level of flooding in the upper part of the town. This raises important questions regarding whether the urban planners really understood the environment in which they were working. What is clear is that the walls deliberately enclosed a vast area including marshlands and it is possible that they were regarded

as equally important elements of the urban settlement and that knowledge and history of this landscape required the incorporation of the wetland area.

It is possible that the difficulties of building such large settlements in some of these locations might not always have been recognised before the construction had begun. The way in which incomers to an area learn to understand the geography in which they settle has been the subject of considerable study, especially in relation to later imperial endeavours such as by Spain and Britain and also the emigrations to North America. The extent to which the local environment and landscape could be understood by incomers to an area in the past has been the subject of a collection of essays *Colonization of Unfamiliar Landscapes: The Archaeology of Adaptation* edited by Rockman and Steele (2003). Whilst it seems that the resources that are available and the limitations of an area can be learnt over time (e.g. Rockman 2003: 3), periodic events such as major floods may not have been predicable and it may have been necessary to experience them for the first time to gain knowledge of them. The speed at which settlers gained an insight into the landscape and awareness of how their actions would affect it probably differed with each place and situation and may have been influenced by the level of co-operation of any existing inhabitants (ibid.: 12).

Local peoples may well have had very different ways of understanding and valuing the places in which they inhabited, and post-colonial perspectives have now emphasised local perspectives in many periods of the past including the Roman period. There have now been a number of important studies investigating the processes of colonial mapping, for example, such as in Spanish South America and British India, which have argued that the images produced by the maps were shaped by the politics and ideology of the incomers who did not view the land in the same way as the local peoples (e.g. Edny 1990; Mundy 1996). Maps also served to transform incomprehensible land into something that they could fathom, control and own. These mapping programmes eventually went some way to transforming the way in which local people viewed the land and behaved and settled in it. Hingley (2006) has emphasised the way in which early scholarship on Roman Britain produced maps of the province that were influenced by the contemporary political and social context of British imperialism. Maps of Roman Britain continue to put an emphasis on the Roman-style settlements such as towns, villas and temples without much recognition of the continuation of local settlements and the importance of pre-existing features such as prehistoric monuments which remained significant elements of the geography (cf. Alcock et al. 2001; Mattingly 2002).

What we know of Roman methods, the land surveying, organisation and mapping of land would certainly have been very different from local traditions and were also have been bound up with very different political and social ideologies (cf. Campbell 2000; Dilke 1971). Official actions on the landscape initiated by higher authorities, consequently, will not necessarily have been suitable in the local contexts in which the work was undertaken. There are numerous more recent examples of this than from the Roman period. Scott's (1998) book, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*, for example, demonstrated how forced attempts to alter the land and land use in colonial Africa and Soviet Russia, with the introduction of settled villages and farms, often ended in failure because they were not suitable for the local environments and traditions. The authorities did not understand the local landscapes and how they should be used and organised. For Britain, it is well known that contact with the Continent was well established before the Roman conquest and there were Caesar's expeditions to Britain amongst other likely visits (Caes. *B. Gall.*; cf. Braund 1996b; Creighton 2006). Leaving these familiar historical narratives aside, however, the extent to which local landscapes could ever be fully understood by incomers is a different matter, though it is known that local deities associated with features in the landscape were acknowledged and clearly given importance, for example, as indicated by the offerings at Coventina's Well on Hadrian's Wall (Allason-Jones and McKay 1985).[2] Since a number of towns developed in areas where there was pre-existing settlement and activity there would have been existing knowledge of the local environments in which towns were placed including wet areas and the possibilities of flooding. The nature of the river, however, can change considerably through the year. The extent to which the building of the urban settlement might have affected the hydrology of the area, moreover, would probably not have been known or predicted in any detail. In some cases, alteration of the waterscape may only have been perceived as necessary as the town developed.

[2] Near the fort of Carrawburgh on Hadrian's Wall was a spring dedicated to the water-goddess Coventina and a large number of votive offerings were found here in the nineteenth century indicating the veneration of this local goddess by the military personnel stationed there (Allason-Jones and McKay 1985).

CHAPTER SIX

CONCLUSIONS: TOWNS, WATER AND PLACES

This book set out to examine aspects of the relationship between urbanism and water in Roman Britain analysing the way in which the waterscape formed an element of each urban development and the experience of its residents. It is important that studies on water in towns do not concentrate solely on water supply, bathhouses and other aspects of their infrastructure but also look at the way in which rivers, lakes, pools, wetlands, waterfronts and groundwater formed significant elements of townscapes. Through human use, action and experience, these components of waterscapes formed a major part of the urban settlement. The focus on water and towns in this book is also intended to change our approach to urbanism and avoid the dangerous assumption that we already understand the nature of Roman urbanism and the urban experience and that as a result no new approaches or analyses are needed.

In an attempt to understand the complexity of the relationship between settlement space and water, three frameworks of analysis were identified: geographical, geoarchaeology and cultural approaches towards studying rivers; the way in which theoretical advances in maritime archaeology can help us to understand waterfronts and port and harbour archaeology; and how developments in wetland archaeology can enable us to gain a more nuanced understanding of the relationship between human activity and wetland areas in urban contexts. Many components of waterscapes in urban settings were artificially altered as towns developed including the revetting, canalisation and redirection of rivers, the construction of waterfront installations, the infilling of waterways, wetland drainage and land reclamation. These activities transformed the land and the urban topographies, created new land, and altered the relationship between land and water. The actions taken on waterscapes, however, would not have been regarded simply as practical negotiations with land and water—and this is important for rethinking our understanding of the way in which urban space was experienced. It is also possible to conduct social analyses of these landscape events which these three frameworks allow us to do and they put an emphasis on people and agency rather than simple descriptive approaches to the material.

The presence of water has obvious practical benefits for settlements and it might be that in some cases these outweighed the disadvantages that often presented themselves in establishing towns in wet locations. It might also be that any difficulties with the location, due to seasonal or periodic excesses of water, were not recognised at the time of foundation. This possibility, however, would perhaps be less likely since the nature of most landscapes would have been well known. The cultural significance associated with watery places, however, will also have formed an important aspect of urban development. As town spaces were, constructed, actions such as altering rivers, draining wetlands and reclaiming land will have formed a significant element of each settlement biography but also transformed the way in which the landscapes were used and negotiated. Moving rivers, carrying out land reclamation and building waterfronts will have been acts that were just as monumental as constructing public buildings. Altering the landscape in monumental ways was not new in Roman Britain, as can be seen prehistoric monumental constructions (e.g. Bradley 1993; Cunliffe 2005), but altering waterscapes in a major way does appear to have been an additional aspect of the way in which land was changed and manipulated which became more intensive in Roman times. The way in which waterscapes have continued to be changed over time has been connected as much with social contexts and cultural ideas as with practical needs.

Towns and People

Urban development was clearly a complex process in Roman Britain and whereas in the past there tended to be emphasis on a relatively unproblematic and systematic process of military planning, coercion and Romanisation (e.g. Frere 1967; Wacher 1975), it is now clear that each case of urban development was the result of a unique sequence of events and motives incorporating the ideas and actions of local peoples, landscapes, histories, myths and external inputs and influences (cf. Creighton 2006; Mattingly 2006; Millett 1990; Rogers 2008; 2011a; forthcoming). Local perceptions of places and social traditions of labour organisation may have been just as important as external influences in the construction of towns. Through examining information relating to the scale, design and materials used in the construction activities, moreover, as with buildings analysis, it is possible to carry out more detailed social analyses of the changes to waterscapes, such as individual choices in land reclamation and waterfront construction (see Chapters 4 and 5), in terms of how they relate to the identity of those carrying out the changes (cf. Gardner 2007; Rogers 2011b).

In Roman archaeology there is often a simplistic dichotomy used when examining agency between 'Roman officials' and 'indigenous' actors. In Britain, what we now know about the process of urban development and indigenous reactions to Rome, suggests that processes are likely to have been more complex and nuanced with some existing local elites becoming town officials, some people gaining and others losing power, and others resisting involvement (cf. Mattingly 2006). The years leading up to, and immediately after, the invasion date of AD 43 also seem to have been a time of social change and flux with group identities evolving and those able to accrue power perhaps changing at a rapid pace (cf. Creighton 2006; T. Moore 2011). Scientific techniques, especially isotope analysis, carried out on skeletal material from Roman urban cemeteries have also been able to reveal more information about the range of origins and numbers of people from outside Britain that came into the towns (Eckardt et al. 2010). The *coloniae*, especially, are likely to have had a large numbers of incomers who probably also served on the town council. The cultural mix of people will also have had an impact on the urban experience and the range of different reactions to structural developments and landscape change. It is clear that issues of agency relating to the treatment and use of waterscapes in towns will have involved a complex range of peoples and identities. People are key to our understanding of towns as living and changing places and the way in which these urban spaces were experienced. Even if individuals were not directly involved in altering the waterscapes, they may well have had reactions to the changes.

A number of major alterations to river courses were identified in this study especially at Cirencester, Winchester and probably also Lincoln. Such activities must have involved some kind of central organisation but they were most likely locally initiated at provincial level rather than the result of a higher up ruling. Without textual evidence or inscriptions relating to the events themselves, our understanding must be based on our knowledge of the origins of each town and the people involved in the urban development. At Cirencester the evidence of the small auxiliary fort at Leaholme preceding the town is far from conclusive and it may be that there was no military settlement here at all at any point. It has already been argued that Cirencester was located in a place of symbolic importance in a watery location and near some possible Iron Age burials in the Tar Barrow field. The road network diverts from this higher ground and goes straight for the low-lying watery area which might indicate that it was either avoiding the burial area or going towards a place of importance, or perhaps both. Placing the town in this location may have been the result of local elites wishing to develop a site

that was already important or the military wishing to control such a place. Diverting the river may not only have had practical implications but could be a sign of military power or local elites wishing to display their power and ability to alter the land. Winchester is a similar case where there is no evidence as yet of military occupation and the town development may relate to negotiations amongst the military and local officials. It is in this context that we should probably see the major alterations of the river course. At Lincoln, the military is likely to have had a far greater involvement with the establishment of a fortress by Legion IX and if the River Till was indeed redirected and canalised at this time this would most likely relate to military operations to create a more usable waterway.

Waterfront development, as we have seen (Chapter 4), can also be linked to identity and the way in which people could make a mark on the town. At London there has now been some more emphasis on military involvement in the urban development (e.g. Perring 2011) but, as already noted, the identification of an early fort in the Cornhill area remains problematic. The large-scale waterfronts on the north side of the Thames may well have been a military initiation for strategic control and to enable the supply of resources (ibid.). The evidence of civilian occupation in early London suggests that settlement may have been fairly opportunistic at this time and that it only later became a more major economic and elite focus as the settlement developed and the public buildings were constructed. Over time waterfront installations were constructed on the south side of the Thames and the north side waterfronts were extended and rebuilt. It is likely that it was down to local landowners to maintain the waterfronts but developing localised smaller scale installations can also be considered in terms of changing attitudes to land and water and the relationship between the two (cf. Rogers 2011b). These construction activities, however, also importantly now represent the actions of individuals on the land and can be seen as expressions of individual identities. A similar process of development and maintenance can probably be seen with the waterfronts at Lincoln and Gloucester.

The large-scale drainage and reclamation activities at Winchester, Lincoln, London and elsewhere suggest some kind of centralised planning whether by local power holders, the military or some other collective form of organisation perhaps of local land owners. It is likely that each town will have been different depending of the nature of the political situation and the origins of the settlement. Smaller-scale events such as the localised drainage and reclamation of land can also be considered as individual expressions with people changing the land and asserting their identities onto the land.

Importantly, however, they can perhaps also be considered in terms of changing attitudes to land and they will had an impact on the way in which the land was experienced in these localities.

Whilst the small projects are likely to have been undertaken by those making the decision for the work, the physical labour involved in the large projects is unlikely to have been undertaken by the decision makers. Instead, the work is more likely to have been carried out by soldiers, local residents, itinerant workers or slaves. In each case, the reactions and perceptions to such work is made more complex by the range of origins of people in each of these categories. As seen in Chapter 4, for example, one piece of timber from a quay at London had a stamp reading TRAECAVG which has been suggested may indicate the presence of a Thracian unit here possibly involved in the construction of this section of waterfront (Hassall and Tomlin 1996: 449). If merchants and landowners were involved in the maintenance and rebuilding of the London installations they are likely to have come not only from across Britain but across the Empire and the cultural values associated with the events may also have varied. In some cases slaves may also have been used in these construction activities and these could have been taken from existing societies or brought into the provinces as Britain was incorporated into the Empire. All of these people will have had different experiences of, and reactions to, the construction work and the way in which the waterfront structures were used.

Chapter 5 explored the possibility that in some cases the organisation of these major structural activities may have related to pre-existing ways of organising and carrying out monumental projects such as *oppida* earthworks, hillforts and other monuments. People may have been encouraged to come together in these construction events by local power holders, involving ceremonies and feasting, and they may have been an important way of asserting identities onto these places. The construction events will have formed a significant component of the meanings associated with these places.

The approach to understanding Roman urbanism and the urban experience presented here, focusing on the themes of water and landscape change, can, then, tie into the wider understanding of issues relating to the Roman world including the debate on 'Romanisation' in the provinces and expressions of identity within the Roman Empire. The evidence for the development of urbanism in Roman Britain has always been central to discussions of 'Romanisation' from Francis Haverfield (1912) and his contemporaries onwards. Conventionally towns have been viewed as markers of civilisation bringing improved forms of living to local peoples; they were what the Romans gave to Britain. More recently, however, increasingly there have been

attempts to consider the variety of viewpoints that existed and reactions that took place to Rome's presence in Britain (e.g. Creighton 2006; Mattingly 2006; Millett 1990; Revell 2009). Urban development is likely to have been a much more nuanced process involving negotiations, concessions, coercions and other forms of social relationships and practices.

The way in which waterscapes were treated in the Roman period in Britain appears to have marked a change from earlier periods where there is far less evidence of any major attempts to alter rivers, wetlands or waterfronts. It might be possible to suggest that changing attitudes to the land formed part of the cultural influences or changes that came into Britain as it was incorporated into the Roman Empire. Like other influences, they would have been adopted or rejected to different degrees and in different ways according to local group and individual identities, ideas and preferences. The activities carried out by incomers, perhaps often forcing themselves onto the land, would also have encouraged a wide range of responses from local people as their landscapes were altered in new ways. Mattingly (2006) has described Britain as a land of 'discrepant experiences' where ideas, ways of behaving and material culture were interpreted through the mindsets of groups and individuals. There will have been a discrepancy in the experiences that there will have been in Roman Britain as people had to adjust to the new political situation but in many cases they could also follow their own interests in the way in which their life changed. These processes can be considered to have formed part of the way in which urban spaces developed (cf. Creighton 2006) and land was altered for use. For Mattingly (2006), Britain was a landscape of opportunity but it is necessary not to place too much emphasis on the importance of economic advantage and exploitation since there are many social and cultural aspects that also need to be considered relating to land and place and the ways in which they were used, treated and experienced as a reflection of identity. The treatment of land and waterscapes is not something that has received much attention in discussions of 'Romanisation' and identity. Actions such as land drainage, river diversion and waterfront construction, however, represent changing attitudes to the landscape which could form part of our understanding of social change.

There is considerable potential in rethinking our approach to water in urban contexts to gain a more sophisticated and stimulating account of town development and the urban experience. As one of the most value-laden substances in the past, as it still is today, water can never form a neutral or unproblematic element of the landscape or of the settlement in it. In order to understand the relationship between towns and water this book has argued for the need to develop interpretative frameworks relating to

the significance of urban space and the cultural meanings attached to water including rivers, waterfronts and wetlands. This focus on water as an element of settlement, moreover, demonstrates the extent to which there still remains considerable potential in reconsidering our understanding of urbanism and the experience of urban space in the Roman period.

Waterscapes: Furthering the Archaeological Agenda

This book has explored a number of issues with which to examine the theme of water and the relationship between water and towns. It has attempted to demonstrate the way in which we can study the significance of water as an element of the settlement record. This theoretical framework of archaeological interpretation can help us to get a better understanding of urbanism, the urban development and the way in which towns were experienced in the Roman period. But it can also be applied to other settlements and periods as well as providing new ways of looking beyond built spaces in order to examine and analyse the wider landscape. An interpretative framework that gives equal importance to water and land can help us to develop a more nuanced understanding of past attitudes to, and experiences of, landscape. Whilst archaeological studies have tended to focus on land, buildings and monuments, water also formed an important context for human action, experience and emotion. The way in which water and watery contexts were used and treated, and how this changed, in the Roman period can also tie into broader understandings of issues relating to culture change and continuities.

There also remains considerable potential for future work and this section discusses a number of areas relating to the archaeology of water and urbanism that would advance our understanding of the urban experience. Some of these involve scientific specialisms which can be drawn upon in collaborative projects to investigate urban spaces and there is huge potential in developing exciting projects utilising the wealth of existing archaeological material as well as material that comes from future fieldwork. Whilst this book has emphasised the need to contextualise our understanding of the changes to waterscapes in terms of time and space, by concentrating on the towns of Roman Britain and the social changes that occurred at this time, it would be possible to extend the study to other parts of the Empire, to beyond its bounds and to later periods. The contextual significance of each period would demand their study by specialists of those various areas but

collaboration between archaeological specialists of different periods would prove hugely beneficial in our understanding of the longer-term biographies of settlements and places. The medieval and post-medieval periods witnessed considerable social changes of their own which had an impact on the nature and experience of landscapes and urbanism including the treatment and use of waterscapes (as documented briefly for Lincoln in Chapter 5; cf. Borsay 1989; Tarlow 2007). Globally, waterscapes and their relationship with urbanism will have had different meanings according to local traditions and external influences. The details of these realities can be investigated by experts of these fields of interest and fruitfully compared with other areas and periods.

Archaeological Writing

All methods of archaeological interpretation are theoretical in nature, and it is possible to suggest some additional perspectives to those of landscape archaeology which conventionally focuses on economic and other functional interpretations. It is noticeable that most archaeological fieldwork reports, either excavation or survey work, provide a discussion of the location of the site. This is usually technical with an account of the underlying geology, soil types, water level, ground cover and river courses. An example, similar to many publications of archaeological fieldwork, is the recent report of excavations in Winchester (Ford et al. 2011: 5–6): "The City of Winchester sits at the western end of the South Downs, a linear band of chalk downland that extends eastwards through Hampshire and Sussex to Beachy Head and the Seven Sisters on the south coast. This distinctive downland landscape has been formed over millions of years". It goes on that the "topographic position of the modern city of Winchester and its surroundings has been favourable for access to a good variety of natural resources relating to the geology and habitats provided by hill and river valley. Its situation, at the narrowing of the valley where the river is divided by islands, provides an advantageous and relatively easy crossing point over the Itchen for east-west inland routes and forms a natural crossroads with routes heading northwards from the south coast". This information is obviously important and it is then often used to explain the choice of location of a site and its economic potential; but there is then little consideration of the cultural values attached to these places that may well also have placed an important part in the way in which these locations were understood. These elements are obviously more difficult to pin down and study than the physical elements of landscapes but this does not mean that they should be attempted.

It is possible to draw on theoretical frameworks developed in other areas of archaeology as well as other disciplines such as human geography to help us to consider the complexities of meanings relating to the archaeological evidence (cf. Johnson 2007; Shanks and Tilley 1987; Tilley 1994). There remains considerable opportunity for developing analyses of landscape data through different theoretical perspectives combining detailed datasets with stimulating approaches can help bring new directions to landscape archaeology. In the urban context it is also possible to draw on theoretical approaches from social history and urban geography to explore the significance behind land use and the experience of the urban topography. Through further collaborative work between these disciplines, it would be possible to conduct detailed studies of the way in which urban spaces have been used, experienced and altered over time. Attitudes towards human actions relating to waterscapes need to be placed within the social contexts of the period, the study of which requires a combination of archaeological specialisms. Urbanism itself can be considered in terms of an ideology, influencing the way in which people behave and think about the world, and land and waterscape change can be considered to be as an important element of this.

Land Use and Natural Resources

The use and transformation of space for urban development in Roman Britain can also be considered in the more general context of the increased exploitation of land and natural resources in the Roman period. This includes intensified agriculture and mining and the use of materials such as wood, stone and clay for building and other purposes. The use of resources and the organisation of land exploitation in the Roman period is an area that is now receiving more attention (e.g. Mattingly 2006; 2011; Rippon 2000a). The potential for exploitation is likely to have been an important element of the way in which the land and environment was viewed and treated as it was incorporated into the Roman Empire. The use and control of water for urbanism and other purposes can also be considered in terms of the exploitation of natural resources. There remains considerable potential for considering the way in which water was used in Roman Britain and the social attitudes towards this use—including how these attitudes differed between local peoples and incomers.

Watermills were a significant element of towns and cities in medieval and later times (Lucas 2005). They were also used in the Roman period (Bennett et al. 2010; Oleson 1986; Ö. Wikander 2000b; Wilson 2008), but unfortunately still very little is known about watermills in the urban context in Roman

Britain (see Chapter 2), or how they might have contributed to the alteration of waterscapes. They could potentially be of importance for understanding the changing nature of urban waterways in the Roman period. Millstones are known from urban contexts but often with very little accompanying contextual information surviving in the records. Future excavations might be able to provide more information regarding the context of millstones when they are discovered and any relationship that they had with urban waterways.

Geography, Geology and Geoarchaeology

In examining Roman period urbanism there is considerable potential in carrying out collaborative work with geographers and geologists who are working on current issues relating to rivers, hydrology and environmental change (e.g. Tockner et al. eds. 2009; Wohl 2007; 2011). The scientific expertise of much of this work can be of considerable value to archaeology and has already contributed to important work in geoarchaeology (e.g. A. Brown 1997). The detailed and scientific micro-topographical analysis of the land on which Roman towns developed is an example of the potential of such collaborative work. The study of the development of the urban topography at Lincoln has demonstrated just how complex and extensive changes to local landscapes can be (Stocker ed. 2003). Here a number of pools and islands are known to have existed in the low-lying area of the Witham floodplain and Brayford Pool (Chitwood 1991), but considerably more work is needed on reconstructing this landscape and how it was altered through medieval and into modern times. The way in which streams and rivers have been altered in urban contexts is equally complex with some been completely lost over time. As a result of these changes, it is easier to neglect their role in the topography of Roman towns and detailed analyses of excavation data are needed in order to reconstruct the early waterscapes. Bore-hole surveys could also prove useful for providing relatively cheap and easily obtainable stratigraphic samples over a wide area.

Dating

Further work is also needed to establish good dating evidence for the alterations to rivers and other aspects of the waterscapes in urban contexts. This is of crucial importance for identifying when individual changes to the townscapes took place and for understanding the cultural context and significance of these changes. The dating of early events can be made more difficult because of the fact that later alterations can mask earlier activities that took place. The problems with dating the river channel at Chichester

(Down 1988; Magilton 1996) highlights the need to establish clearly when events took place through obtaining well-dated stratigraphic sequences. In the case of the Fossdyke at Lincoln, for example, it would be useful to develop a project to date scientifically the early deposits relating to the redirected River Till preserved in the waterlogged conditions (M. Jones pers. comm.). Similar projects would also be useful at other towns such as Leicester and Cirencester where there remains considerable uncertainty about how and when the various river branches were altered over time.

Environmental Evidence

Another important area of research is the examination of environmental evidence including pollen, seeds, other plant remains and insects. These tend to survive well in waterlogged conditions and they can be very informative of the types of environments that existed in and around the watery areas within town contexts (cf. Sidell et al. 2002; 2008). The watery environments, and the plants and animals associated with them, will have had an impact on the sights, sounds and smells of the urban experience. The study of environmental evidence is a specialist area in archaeology but collaborative work with environmental archaeologists could prove hugely productive and provide detailed insights into the appearance and nature of towns. Analysis of environmental evidence could also provide more information on the way in which the urban environment changed over time as a result of alterations to the waterscapes.

A recent publication of the excavations on the north bank of the Brayford Pool in Lincoln, for example, included an important section on the environmental evidence from the site (Carlyle and Atkins 2009). The excavation was associated mainly with land reclamation of the medieval period but it demonstrates the potential for similar studies and publications connected with Roman material. There was very good organic preservation of plant remains in this excavation with samples producing large quantities of botanical material preserved through waterlogging (Giorgi 2009). As well as remains of cereals and fruits relating to diet, there were also a large number of wetland plants represented by their fruits and seeds including aquatic, semi-aquatic and bankside/marshland species. A number of the bankside/marshland species also grow in shallow water and samples included evidence of celery-leaved crowfoot and bogbean. Other bankside/marshland species included rushes, sedges, spike-rush and marsh pennywort (ibid.: 28–29). Insect remains also indicate the deposition of cess material and rubbish in the waterfront zone (Smith and Morris 2009) indicating that this area was probably fairly

mucky and associated with strong odours. Through this evidence we can begin to get an idea of the nature of the local environment in this river and lakeside area of the town.

The 2002 excavations and post-excavation analysis of material at the 6–8 Tokenhouse Yard site in London has demonstrated the potential of studying botanical remains to reveal the impact of wetlands on the urban environment. The published report integrated the analysis of the botanical remains undertaken by the specialist environmental archaeology service ArchaeoScape (Branch et al. 2012) within the description of each period to provide a much more vivid account of the nature of this area of the town and how it changed over time. At the time of the first urban development of the area between AD 50–70, for example, there was clear evidence of damp marshland with areas of standing water with plants common on wet ground and lake edges including creeping buttercup, marsh dock, the common spike-rush, sedges associated with wetlands and blinks (or water-blinks, water brickweed) (Leary and Butler 2012: 9). In the period AD 70–100 organic remains included the in situ stump of a fruit tree suggested the area was well watered but not totally waterlogged ground but which later on became more waterlogged and led to the preservation of the tree (ibid.: 12). In this period there were also peaty deposits suggestive of plant remains in waterlogged conditions perhaps indicative of episodes of flooding (ibid. 13), and periods of flooding could also be identified in later phases through plants indicative of these conditions. These episodes were then often followed by further attempts at ground consolidation. Specialist analyses for each urban excavation, with results organised by chronological period, such as this can provide a better understanding of how watery areas in urban settings influenced town life and the urban experience.

Final Remarks

Rivers, and other components of waterscapes, can be studied from a variety of perspectives ranging from physical geography and geology to archaeology and social history. It is within this complexity of possibilities that the relationship between urban space and waterscapes should be considered. Rivers have a dynamic force; they flow through space and time changing the land whilst also creating a sense of continuity over the longer term. They form a significant part of the fabric and biography of towns through the way in which they are used, their courses change, they overflow or diminish and they are increasingly controlled. Rivers and other elements of waterscapes can

form significant elements of the history of settlements; they are often their oldest visible components and which histories and myths can be associated within them. They were also often key elements in the changes that took place in both urban and rural contexts in the medieval and post-medieval periods as land was reorganised and increasingly rationalised and exploited. Rivers that ran through towns and cities were increasingly controlled, many being canalised, streams were in-filled and marshland areas were drained. In Roman Britain it is possible to consider changes to waterscapes from a variety of levels and perspectives from discussions of the nature of Roman imperialism to local identities and experiences. The complexity of the social significance of rivers, and other components of waterscapes, and their interaction with built urban space, indicates how much potential there remains in studying Roman urbanism, the urban experience and landscape archaeology.

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